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LISTS OF SPECIES

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Angiosperm diversity of the Theosophical Society campus, Chennai, Tamil Nadu, India

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Abstract: This paper deals with the list of flowering plants from the Theosophical Society campus (TS), Chennai. The Theosophical Society campus is the second largest green patch in the city of Chennai, next to Guindy National Park. A total of 449 taxa have been recorded comprising 161 trees, 84 shrubs, 179 herbs and 25 climbers that are distributed in 353 genera, represented in 85 families, 11 super orders and 35 orders as per the APG III classification. Superorder Fabids and Lamids account for about 49% of the taxa. Paleotropical elements (66%) dominate the TS campus followed by Neotropical elements (31%). The present study reveals that TS campus has a rich and diverse exotic flora. The garden department of this protected campus takes care of conserving the floral diversity. Hence, Theosophical Society campus can be considered as a major biodiversity heritage site and an indispensible lung space for the city of Chennai.

Key words: Flowering Plants, Exotic flora, Theosophical Society, Chennai, Banyan tree

INTRODUCTION

The interaction between plants and people is as old as history of human origin and civilization. Traditional societies throughout India have valued plant species and preserved them. Though preserving plants and forests in their wild state has been in existence from ancient times, cultivating and propagating plants of economic importance including ornamentals started much later when settled agriculture came into vogue. Human beings play a major role in the introduction and spread of non-native species through activities such as agriculture and horticulture, increasing the species richness of plants in urban habitats (Reichard and White 2001). Cities are among the most important ecosystems transformed by anthropogenic activities (Antipina 2003). Altered vegetation is an important component of transformed urban ecosystems. Urban societies have influenced the growth of gardens for social, cultural and emotional needs. Many temperate and tropical plants were introduced into India during colonial regime which brought changes in the composition of the exotic flora of India, especially of the urban areas. However, exclusive taxonomic studies on the exotic flora are limited.

The city of Chennai which had its origin about 373 years ago as a group of fishing hamlets, has now developed into one of the major metropolitan cities of India (Muthiah 2008). Many areas of the present Chennai had earlier supported lush vegetation either in the form of thoppu (plantation) or in the form of natural forests. However, the major green space in Chennai is now restricted to two areas namely Guindy National Park, and its adjoining areas, and the Theosophical Society, Adyar.

This study is an attempt to record the flora of the Theosophical Society campus (TS) which has been the centre for its International activities for over 100 years. The TS campus retains natural vegetation along the banks of the Adyar River and coast and has a high concentration of exotic species, including several rare ones.

MATERIALS AND METHODS

Study area

The study area is the international headquarters of the Theosophical Society (TS), (Figure 1) located in Adyar on the southeastern coast of Chennai and covering an area of about 1.1 km^2. The society was founded in 1882 by Madam Blavatsky and Colonel Olcott. The society attained great prominence during Dr. Annie Besant, who was the second president of this society. It has a rich diversity of trees and shrubs from different parts of the world. The campus is bounded on the north by Adyar River (Figure 2), on the south by Besant Nagar, on the

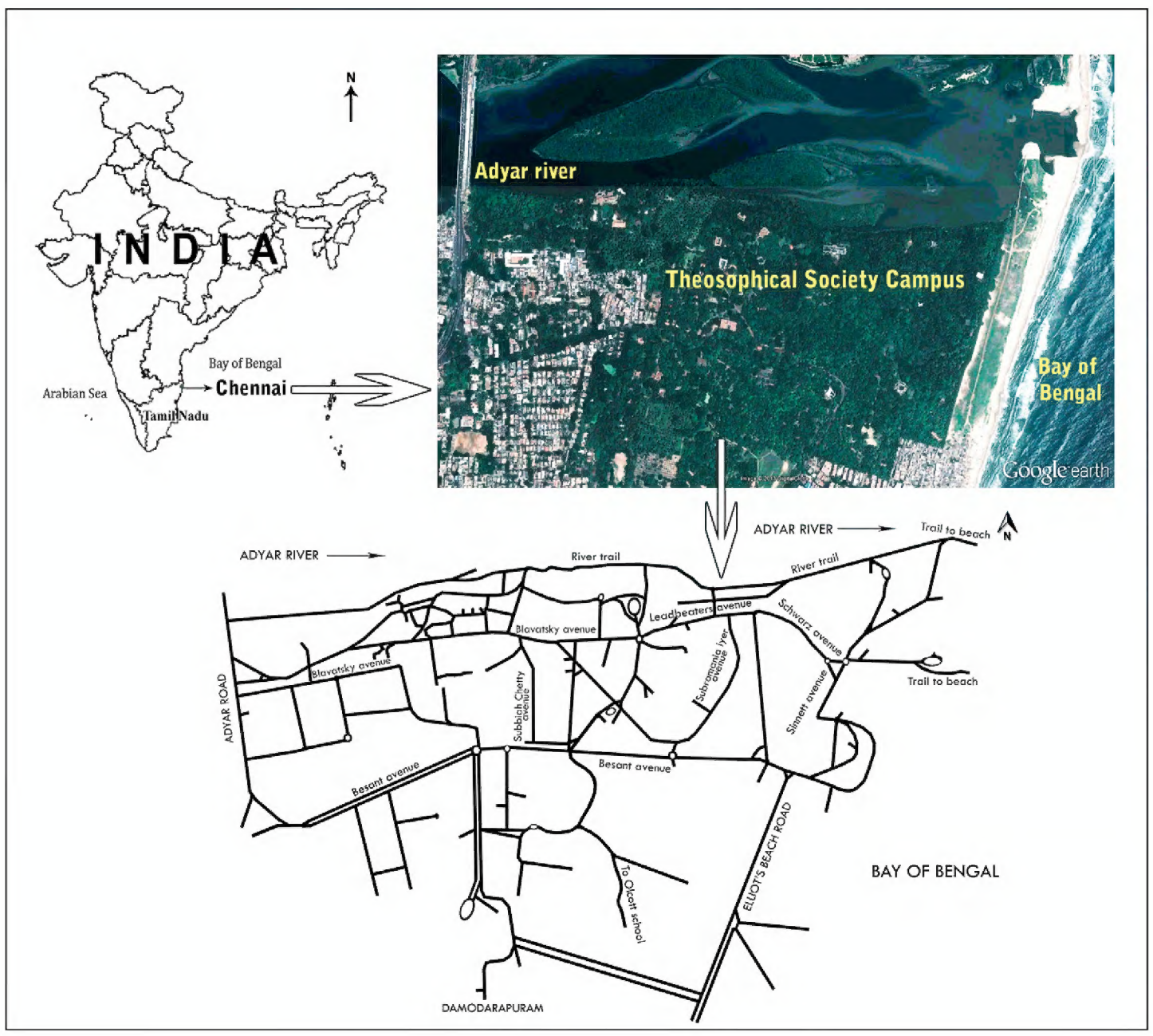

Figure 1. Map of Theosophical Society campus, Chennai.

west by Gandhi Nagar and on the east by Bay of Bengal. The soil is sandy along the seashore and less sandy to loamy towards inland and clayey towards the river bank. Typical coastal climate prevails and is very hot and dry from March to May. Temperature dips to its minimum from December to February and is regarded as the cold season in Chennai. The relative humidity ranges from 63–86%.

Data collection

This study was carried out in two phases. The first phase of the study was carried out from August 1994 to December 1996. Weekly field trips were made during this period. After a gap of about fifteen years, periodical visits were made from April 2010 to December 2011. During this period the plants earlier recorded were critically evaluated. Voucher specimens were collected after obtaining permission from the authorities of the TS and were duly tagged. Field observations were made and plants were photographed. Plant specimens were identified using relevant floras and pictorial guides (Brown 1862; Mayuranathan 1929; Bailey 1949; Gamble and Fischer 1957; Backer and Brink 1965; Swarup 1967; Matthew 1969; 1999; Graf 1978; 1981; 1992; Dassanayake and Fosberg 1980–1991; Bose and Chowdhury 1991; Sanjappa 1992; Livingstone and Henry 1994). The collected materials were poisoned using standard herbarium techniques

Figure 2. Vegetation along the Adyar River bank.

(Jain and Rao 1977). Herbarium sheets were deposited in Foundation for Revitalisation of Local Health Tradition (FRLHT), Bengaluru.

Data analysis

The data was analyzed based on various parameters such as habit, nativity, rare and noteworthy trees including exotics. The phytochorionomic categories of the species were analyzed based on Takhtajan (1986). The plant species are enumerated and arranged as per Angiosperm Phylogeny Group III Classification (APG III 2009; Stevens 2012). The nomenclature of the species

was checked using GRIN (2012), ILDIS (2012), IPNI (2012), TROPICOS (2012) and WCSP (2012).

RESULTS AND DISCUSSION

The first exclusive study on the flora of the TS campus was carried out by Rao (1957) who reported about 223 taxa consisting of 119 trees, 12 shrubs, 79 herbs and 13 climbers. After a gap of about 37 years the polypetalous and gamopetalous flora were studied by Irwin (1996, unpublished data) and monochlamydeous and monocots were studied by Thomas (1997, unpublished data) and reported a total of 421 taxa consisting of 141 trees, 79 shrubs, 173 herbs and 28 climbers. Members/visitors from many parts of the world have introduced several plants into the campus.

The present study documents a total of 449 taxa (Table 1) distributed in 353 genera, representing 85 families as per APG III classification. These taxa are distributed in 11 superorders (Figure 3) and 35 orders. 26% of the taxa are reported from the superorder Fabids, 24% from superorder Lamids, 22% from superorder Malvids and 16% from superorder commelinids. Order Fabales (61), Lamiales (55), Sapindales (51) and Poales (48) account for about 48% of the species in the TS (Figure 4). Of the 449 taxa 161 are trees, 84 shrubs, 179 herbs and 25 climbers (Figure 5). Family Fabaceae and Poaceae are represented by about 23% of the taxa. The other dominant families are given in Table 2. Thirty-five families are represented

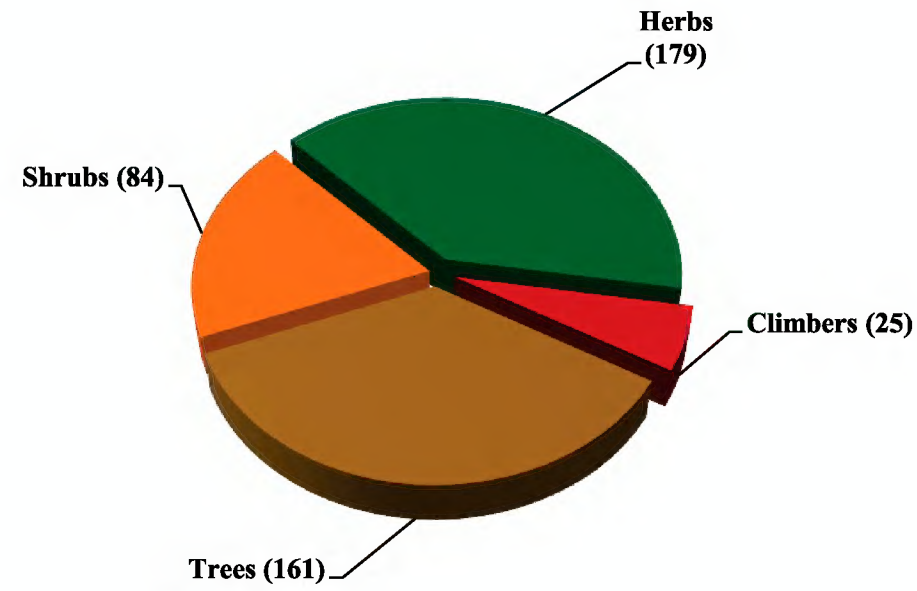

Figure 5. Life form composition in the TS campus.

by single species each. The genus *Euphorbia* tops the list with seven species, *Phyllanthus* with six species, followed by *Cassia* and *Ficus* each with five species and *Bauhinia*, *Hibiscus*, *Indigofera*, and *Senna* four species each.

The native flora of the TS campus consists of three different elements, namely mangroves, psammophytes, and tropical dry evergreen. *Avicennia marina* and *Excoecaria agallocha* are restricted to the tidal zone along the Adyar estuary. These are the only two mangrove species seen in the TS campus. This is the only locality for the entire city of Madras where these species naturally occur in abundance. On the eastern side of the campus as well as the interior portions of the northern side have sandy soil. *Bulbostylis barbata*, *Cyperus arenarius*, *Oldenlandia stricta*, *Ipomoea pes-caprae* and *Pupalia lappacea* are the most common and predominant psammophytes in this region. *Pamburus missionis* is the only tropical dry evergreen element occurring in the campus. The ground flora is dominated by grasses such as *Alloteropsis cimicina*, *Apluda mutica*, *Urochloa reptans*, *Pennisetum ciliare*, *Chloris barbata*, *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Digitaria ciliaris*, *Echinochloa colona*, *Heteropogon contortus*, *Panicum repens*, *Setaria barbata*, and *Trachys muricata*. The rest of the areas have cultivated plants and coconut groves (Figure 6).

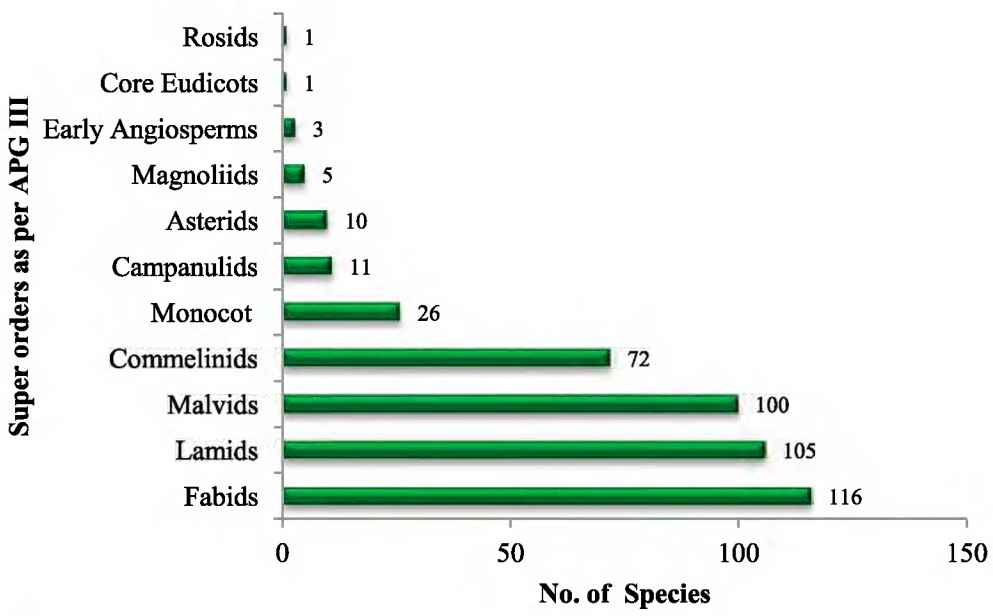

Figure 3. Distribution of species in superorder as per APG III.

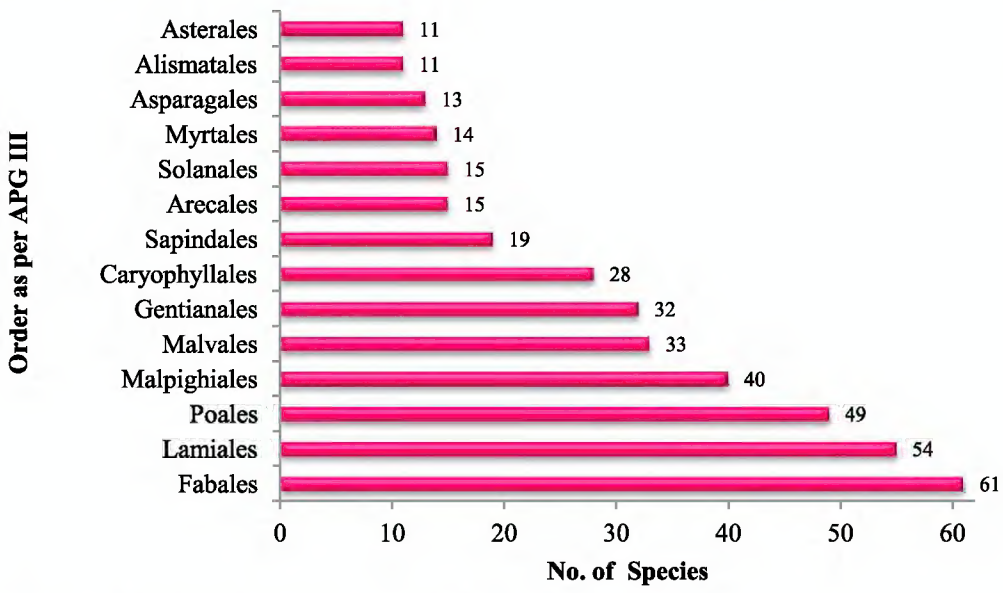

Figure 4. Orders with more than 10 species.

Table 2. Families of angiosperms with more than ten species in the Theosophical Society Campus, Chennai, Tamil Nadu, India.

Families	No. of species
Fabaceae	62
Poaceae	40
Malvaceae	33
Euphorbiaceae	20
Apocynaceae	18
Arecaceae	16
Rubiaceae	14
Acanthaceae	14
Bignoniaceae	12
Lamiaceae	11
Araceae	10
Amaranthaceae	10

Table 1. List of angiosperm taxa recorded from the Theosophical Society Campus, Chennai, arranged according to the Angiosperm Phylogeny Group Classification III.

Superorder/ Order	Family/Species	Habit	Voucher No.
EARLY ANGIOSPERMS			
Nymphaeales	**Nymphaeaceae**		
	Nymphaea alba L.	H	2112
	Nymphaea nouchali Burm. f.	H	2113
	Nymphaea pubescens Willd.	H	2266
MAGNOLIIDS			
Piperales	**Piperaceae**		
	Peperomia pellucida (L.) Kunth	H	5515
Magnoliales	**Annonaceae**		
	Annona squamosa L.	T	2188
	Artabotrys hexapetalus (L. f.) Bhandari	C	9381
	Goniothalamus salicinus Hook. f. & Thoms.	T	2252
	Polyalthia longifolia (Sonn.) Thwaites	T	2211
MONOCOTS			
Alismatales	**Araceae**		
	Caladium bicolor (Aiton) Vent.	H	5537
	Epipremnum aureum (Linden & André) G. S. Bunting	C	5530
	Epipremnum pinnatum (L.) Engl.	C	5486
	Aglaonema commutatum Schott	H	5419
	Anthurium andraeanum Linden ex Andre	H	5531
	Anthurium crassinervium (Jacq.) Schott	H	5443
	Anthurium magnificum Linden	H	5485
	Dieffenbachia seguine (Jacq.) Schott	H	5444
	Syngonium podophyllum Schott	H	5488
	Theriophonum minutum (Willd.) Baillon	H	5432
	Hydrocharitaceae		
	Hydrilla verticillata (L. f.) Royle	H	5450
Pandanales	**Pandanaceae**		
	Pandanus leram Jones ex Fontana	T	5407
Liliales	**Colchicaceae**		
	Gloriosa superba L.	H	5549
Asparagales	**Amaryllidaceae**		
	Crinum asiaticum L.	H	5442
	Eucharis grandiflora Planch. & Linden	H	5525
	Hippeastrum puniceum (Lam.) Kuntze	H	5470
	Zephyranthes rosea Lindl.	H	5451
	Asparagaceae		
	Asparagus aethiopicus L.	H	5475
	Asparagus racemosus Willd.	C	5461
	Chlorophytum capense (L.) Voss	H	5553
	Ledebouria revoluta (L.f.) Jessop	H	5455
	Sansevieria cylindrica Bojer ex Hook.	H	5548
	Sansevieria roxburghiana Schult. & Schult. f.	H	5547
	Yucca aloifolia L.	S	5471
	Orchidaceae		
	Vanda tessellata (Roxb.) G. Don	H	5555
	Xanthorrhoeaceae		
	Aloe vera (L.) Burm. f.	H	5529
COMMELINIDS			
Arecales	**Arecaceae**		
	Areca catechu L.	T	5560
	Bismarckia nobilis Hildebr. & H. Wendl.	T	2874
	Borassus flabellifer L.	T	5559
	Carpentaria acuminata Becc.	T	2300
	Caryota urens L.	T	5524
	Cocos nucifera L.	T	5424
	Corypha macropoda Linden ex Kurz.	T	5561
	Dypsis lutescens (H. Wendl.) Beentje & J. Dransf.	T	5467
	Licuala grandis H. Wendl. ex Linden	T	5477
	Livistona chinensis (Jacq.) R.N. Br. ex Mart.	T	5432
	Nypa fruticans Wurmb	T	5493
	Pritchardia pacifica Seem. & H. Wendl.	T	5478
	Rhapis excelsa (Thunb.) A. Henry ex Rehder	S	5495
	Roystonea regia (Kunth) O. F. Cook	T	5431
Commelinales	**Commelinaceae**		
	Cyanotis axillaris (L.) D. Don	H	5463
	Tradescantia spathacea Sw.	H	5449
	Tradescantia zebrina Bosse	H	5483
Poales	**Bromeliaceae**		
	Billbergia pyramidalis(Sims) Lindl.	H	5558
	Poaceae		
	Alloteropsis cimicina (L.) Stapf	H	5409
	Apluda mutica L.	H	5408
	Aristida setacea Retz.	H	5402
	Bambusa bambos (L.) Voss	H	5535
	Bothriochloa pertusa (L.) A. Camus	H	5534
	Urochloa reptans (L.) Stapf	H	5536
	Pennisetum ciliare (L.) Link	H	5453
	Chloris barbata Sw.	H	5455
	Cynodon dactylon (L.) Pers.	H	5527
	Cyrtococcum trigonum (Retz.) A. Camus	H	5464
	Dactyloctenium aegyptium (L.) Willd.	H	5528
	Dendrocalamus strictus (Roxb.) Nees	H	5480
	Desmostachya bipinnata (L.) Stapf	H	5422
	Digitaria ciliaris (Retz.) Koeler	H	5453
	Echinochloa colona (L.) Link	H	5519
	Echinochloa crus-galli (L.) P. Beauv.	H	5481
	Enteropogon dolichostachyus (Lag.) Keng ex Lazarides	H	5452
	Eragrostis viscosa (Retz.) Trin.	H	5538
	Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult. var. *tenella*	H	5545
	Eragrostis tenella var. *insularis* Umamaheswri & P. Daniel	H	5551
	Eriochloa procera (Retz.) C.E. Hubb.	H	5539
	Heteropogon contortus (L.) P Beauv. ex Roem. & Schult.	H	5541
	Imperata cylindrica (L.) P. Beauv.	H	5497
	Dinebra chinensis (L.) P. M. Peterson & N. Snow	H	5498
	Manisuris myurus L.	H	5543
	Megathyrsus maximus (Jacq.) B. K. Simon & S. W. L. Jacobs	H	5523
	Oplismenus compositus (L.) P. Beauv.	H	5464
	Panicum repens L.	H	5410
	Paspalidium flavidum (Retz.) A. Camus	H	5540
	Paspalum scrobiculatum L.	H	5552
	Paspalum vaginatum Sw.	H	5542
	Perotis indica (L.) Kuntze	H	5550
	Rottboellia cochinchinensis (Lour.) Clayton	H	5430
	Setaria barbata (Lam.) Kunth	H	5454
	Setaria verticillata (L.) P. Beauv.	H	5518

Continued

Table 1. *Continued.*

Superorder/ Order	Family/Species	Habit	Voucher No.
	Sporobolus indicus (L.) R. Br.	H	5466
	Stenotaphrum dimidiatum (L.) Brongn.	H	5520
	Thysanolaena latifolia (Roxb. ex Hornem.) Honda	H	5413
	Trachys muricata (L.) Pers.	H	5401
	Tragus mongolorum Ohwi	H	5456
	Zoysia matrella (L.) Merr.	H	5436
	Cyperaceae		
	Bulbostylis barbata (Rottb.) C. B. Clarke	H	5448
	Cyperus arenarius Retz.	H	5411
	Cyperus distans L. f.	H	5521
	Cyperus manimae Kunth	H	5489
	Cyperus rotundus L.	H	5546
	Fimbristylis ovata (Burm. f.) Kern	H	5532
	Rhynchospora colorata (L.) H. Pfeiff.	H	5522
Zingiberales	**Heliconiaceae**		
	Heliconia psittacorum L.f.	H	5556
	Marantaceae		
	Calathea virginalis Linden	H	5526
	Strelitziaceae		
	Ravenala madagascariensis Sonn.	T	5438
	Strelitzia reginae Aiton	H	5557
	Musaceae		
	Musa × *paradisiaca* L.	H	5426
CORE EUDICOTS			
Dilleniales	**Dilleniaceae**		
	Dillenia indica L.	T	2089
ROSIDS			
Vitales	**Vitaceae**		
	Cissus vitiginea L.	S	2224
FABIDS			
Zygophyllales	**Zygophyllaceae**		
	Guaiacum officinale L.	T	2161
	Tribulus terrestris L.	H	2254
Celastrales	**Celastraceae**		
	Cassine glauca Kuntze	T	2227
Malpighiales	**Euphorbiaceae**		
	Acalypha hispida Burm.f.	S	5439
	Acalypha indica L.	H	5482
	Acalypha wilkesiana Müll. Arg.	S	5491
	Codiaeum variegatum (L.) A. Juss.	S	5505
	Croton bonplandianus Baill.	H	5506
	Euphorbia antiquorum L.	T	2880
	Euphorbia cyathophora Murray	H	5514
	Euphorbia hirta L.	H	5412
	Euphorbia milii Des Moul.	S	5472
	Euphorbia pulcherrima Willd. ex Klotzsch	S	5473
	Euphorbia tirucalli L.	T	5500
	Euphorbia tithymaloides L.	S	5427
	Excoecaria agallocha L.	T	5417
	Hura crepitans L.	T	5416
	Jatropha gossypifolia L.	S	5479
	Jatropha multifida L.	H	5503
	Jatropha podagrica Hook.	H	5484
	Micrococca mercurialis (L.) Benth.	H	5496
	Microstachys chamaelea (L.) Müll. Arg.	H	5404
	Ricinus communis L.	S	5517
	Ochnaceae		
	Ochna jabotapita L.	T	2044
	Passifloraceae		
	Turnera ulmifolia L.	H	2142
	Passiflora foetida L.	C	2118
	Calophyllaceae		
	Calophyllum inophyllum L.	T	2019
	Phyllanthaceae		
	Breynia vitis-idaea (Burm. f.) C. E. C. Fisch.	S	5440
	Flueggea leucopyrus Willd.	S	5457
	Phyllanthus acidus (L.) Skeels	T	9396
	Phyllanthus amarus Schumach.	H	5403
	Phyllanthus emblica L.	T	9395
	Phyllanthus maderaspatensis L.	H	5429
	Phyllanthus reticulatus Poir.	S	5406
	Phyllanthus virgatus G.Forst. var. *gardnerianus* (Wight) Govaerts & Radcl.-Sm.	S	5421
	Putranjivaceae		
	Putranjiva roxburghii Wall.	T	5492
	Salicaceae		
	Oncoba spinosa Forssk.	T	2041
	Malpighiaceae		
	Hiptage benghalensis (L.) Kurz	C	2100
	Malpighia glabra L.	S	2162
	Tristellateia australasiae A. Rich.	C	2064
	Violaceae		
	Hybanthus enneaspermus (L.) F. Muell.	H	2011
Oxalidales	**Oxalidaceae**		
	Averrhoa bilimbi L.	T	2012
	Averrhoa carambola L.	T	2267
Fabales	**Fabaceae**		
	Abrus precatorius L.	C	2157
	Acacia auriculiformis A. Cunn ex Benth.	T	2050
	Adenanthera pavonina L.	T	2040
	Albizia lebbeck (L.) Willd.	T	2074
	Albizia odoratissima (L. f.) Benth.	T	2882
	Alysicarpus ovalifolius (Schumach) J. Léonard	H	2075
	Alysicarpus vaginalis (L.) DC.	H	2256
	Bauhinia acuminata L.	S	2228
	Bauhinia × *blakeana* Dunn	T	2883
	Bauhinia purpurea L.	T	2013
	Bauhinia tomentosa L.	S	2078
	Brownea grandiceps Jacq.	T	2001
	Brownea macrophylla Hort. ex Mast.	T	2147
	Butea monosperma (Lam.) Taub.	T	2080
	Caesalpinia coriaria (Jacq.) Willd.	T	2275
	Caesalpinia pulcherrima (L.) Sw.	S	2081
	Calliandra haematocephala Hassk.	S	2169
	Cassia fistula L.	T	2190
	Cassia javanica L.	T	2189
	Cassia javanica L. subsp. *nodosa* (Buch.-Ham ex Roxb.) K. Larsen & S.S. Larsen	T	2884
	Cassia renigera Wall. ex Benth.	T	2192
	Cassia roxburghii DC.	T	2009
	Chamaecrista pumila (Lam.) V. Singh	S	2247
	Clitoria ternatea L.	C	2033
	Crotalaria laburnifolia L.	S	2022
	Crotalaria verrucosa L.	H	2065
	Dalbergia lanceolaria L.f.	T	9382
	Delonix elata (L.) Gamble	T	2088
	Delonix regia (Boj. ex Hook) Rafin.	T	2087

Continued

Table 1. *Continued.*

Superorder/ Order	Family/Species	Habit	Voucher No.
	Derris scandens (Roxb.) Benth.	C	2197
	Desmodium gangeticum (L.) DC.	S	2002
	Dichrostachys cinerea (L.) Wight & Arn.	T	2885
	Eleiotis monophyllos (Burm. f.) DC.	H	2216
	Enterolobium cyclocarpum (Jacq.) Griseb.	T	2218
	Erythrina variegata L.	T	2092
	Gliricidia sepium (Jacq.) Kunth ex Walp.	T	2096
	Indigofera astragalina DC.	H	2276
	Indigofera colutea (Buem. F.) Merr.	S	2060
	Indigofera glabra L.	S	2274
	Indigofera linnaei Ali	H	2061
	Leucaena leucocephala (Lam.) de Wit	T	2052
	Macroptilium lathyroides (L.) Urb.	H	2148
	Mimosa pudica L.	H	2108
	Peltophorum africanum Sond.	T	2250
	Peltophorum pterocarpum (DC.) Baker ex Heyne	T	2119
	Philenoptera violacea (Klotzsch) Schrire	T	2888
	Pithecellobium dulce (Roxb.) Benth.	T	2120
	Pongamia pinnata (L.) Pierre	T	2124
	Prosopis juliflora (Sw.) DC.	T	2272
	Pterocarpus indicus Willd.	T	2889
	Samanea saman (Jacq.) Merr.	T	2091
	Saraca asoca (Roxb.) Wilde	T	2126
	Saraca thaipingensis Cantley ex King	T	2127
	Senna alata (L.) Roxb.	S	2886
	Senna pallida (Vahl) H.S. Irwin & Barneby	S	2062
	Senna occidentalis (L.) Link	S	2059
	Senna siamea (Lam.) H.S. Irwin & Barneby	T	2008
	Senna spectabilis (DC.) H.S.Irwin & Barneby	T	2045
	Sesbania grandiflora (L.) Poir.	T	2887
	Tamarindus indica L.	T	2039
	Tephrosia villosa (L.) Pers.	H	2138
Rosales	**Moraceae**		
	Artocarpus heterophyllus Lam.	T	9383
	Ficus benghalensis L.	T	5487
	Ficus elastica Roxb. ex Hornem.	T	5459
	Ficus microcarpa L.f.	T	5508
	Ficus racemosa L.	T	5433
	Ficus religiosa L.	T	5458
	Rhamnaceae		
	Ziziphus mauritiana Lam.	T	2217
Cucurbitales	**Cucurbitaceae**		
	Coccinia grandis (L.) Voigt	C	2071
	Lagenaria siceraria (Molina) Standl.	C	2240
	Trichosanthes cucumerina L.	C	2221
Fagales	**Casuarinaceae**		
	Casuarina equisetifolia L.	T	5509
MALVIDS			
Myrtales	**Combretaceae**		
	Combretum indicum (L.) DeFilipps	C	2179
	Terminalia catappa L.	T	2042
	Terminalia mantaly H. Perrier	T	2890
	Lythraceae		
	Lagerstroemia indica L.	S	2135
	Lagerstroemia speciosa (L.) Pers.	T	2136
	Lawsonia inermis L.	S	2894
	Punica granatum L.	S	2245
	Melastomataceae		
	Memecylon umbellatum Burm. f.	T	2105
	Myrtaceae		
	Callistemon citrinus (Curtis) Stapf	T	2021
	Eucalyptus tereticornis Sm.	T	2094
	Eugenia uniflora L.	T	2892
	Pimenta dioica (L.) Merr.	T	2893
	Psidium guajava L.	T	2238
	Syzygium cumini (L.) Skeels	T	2191
Sapindales	**Anacardiaceae**		
	Anacardium occidentale L.	T	2173
	Lannea coromandelica (Houtt.) Merr.	T	2185
	Mangifera indica L.	T	2107
	Meliaceae		
	Azadirachta indica A. Juss.	T	2076
	Melia azedarach L.	T	2203
	Swietenia mahagoni (L.) Jacq.	T	2132
	Rutaceae		
	Aegle marmelos (L.) Correa	T	2895
	Citrofortunella microcarpa (Bunge) Wijnands	T	2898
	Atalantia monophylla (L.) DC.	T	2896
	Citrus aurantifolia (Christm.) Swingle	T	2239
	Citrus medica L.	T	2897
	Limonia acidissima L.	T	2900
	Murraya paniculata (L.) Jack	T	2020
	Pamburus missionis (Wall. ex Wight) Swingle	T	2117
	Triphasia trifolia (Burm. f.) P. Wilson	S	2249
	Simaroubaceae		
	Quassia amara L.	S	2251
	Sapindaceae		
	Filicium decipiens (Wight & Arn.) Thwaites ex Hook. f.	T	2169
	Majidea zanguebarica J. Kirk ex Oliv.	T	9394
	Sapindus emarginatus Vahl	T	2125
	Malvaceae		
	Abelmoschus esculentus (L.) Moench	H	2237
	Abutilon indicum (L.) Sweet	S	2073
	Adansonia digitata L.	T	2171
	Alcea rosea L.	S	2265
	Berrya cordifolia (Willd.) Burret	T	2177
	Berrya javanica (Turcz.) Burret	T	2229
	Bombax ceiba L.	T	2079
	Ceiba pentandra (L.) Gaertn.	T	2083
	Corchorus aestuans L.	H	2068
	Corchorus fascicularis Lam.	H	2047
	Dombeya elegans Cordem.	S	2152
	Fioria vitifolia (L.) Mattei	H	2057
	Gossypium arboreum L.	T	9384
	Guazuma ulmifolia Lam.	T	2010
	Herissantia crispa (L.) Brizicky	H	2067
	Hibiscus lobatus (Murray) Kuntze	H	2058
	Hibiscus rosa-sinensis L.	S	2099
	Hibiscus schizopetalus (Dyer) Hook. f.	S	2098
	Hibiscus tiliaceus L.	T	2187
	Kleinhovia hospita L.	T	2151
	Melochia nodiflora Sw.	H	9385
	Pavonia zeylanica (L.) Cav.	S	2037
	Pseudobombax ellipticum (Kunth) Dugand	T	2168

Continued

Table 1. *Continued.*

Superorder/ Order	Family/Species	Habit	Voucher No.
	Pterospermum xylocarpum (Gaertn.) Santapau & Wagh	T	2186
	Sida acuta Burm. f.	S	2129
	Sida cordata (Burm. f.) Borss. Waalk.	H	2257
	Sida rhombifolia L.	S	2069
	Sterculia apetala (Jacq.) H. Karst.	T	9386
	Sterculia foetida L.	T	2131
	Thespesia populnea (L.) Sol. ex Correa	T	2139
	Triumfetta pentandra A. Rich.	H	2210
	Waltheria indica L.	S	2123
Brassicales	**Cleomaceae**		
	Cleome aspera Koen ex. DC.	H	2084
	Gynandropsis gynandra (L.) Briq.	H	2223
	Arivela viscosa (L.) Raf.	H	2038
	Moringaceae		
	Moringa oleifera Lam.	T	2111
	Capparaceae		
	Crateva adansonii subsp. *odora* (Buch.-Ham.) Jacobs	T	2182
Santalales	**Santalaceae**		
	Santalum album L.	T	5510
Caryophyllales	**Aizoaceae**		
	Sesuvium portulacastrum (L.) L.	H	2207
	Molluginaceae		
	Mollugo cerviana (L.) Ser.	H	2215
	Mollugo nudicaulis Lam.	H	2109
	Mollugo racemosa Lam.	H	2214
	Polygonaceae		
	Antigonon leptopus Hook. & Arn.	C	5476
	Muehlenbeckia platyclada (F. Muell.) Meisn.	S	5513
	Triplaris weigeltiana Kuntze	T	9387
	Amaranthaceae		
	Achyranthes aspera L.	H	5405
	Aerva lanata (L.) Juss. ex Schult.	S	5434
	Allmania nodiflora (L.) R. Br. ex Wight	H	5437
	Alternanthera bettzickiana (Regel) G. Nicholson	H	5415
	Celosia argentea L.	H	5460
	Digera muricata (L.) Mart.	H	5414
	Gomphrena globosa L.	H	5499
	Gomphrena serrata L.	H	5501
	Pupalia lappacea (L.) Juss. var. *lappacea*	H	5446
	Pupalia lappacea Juss. var. *orbiculata* (Heyne ex Wall.) C. C. Towns.	H	5512
	Portulacaceae		
	Portulaca oleracea L.	H	2202
	Portulaca grandiflora Hook.	H	2170
	Nyctaginaceae		
	Boerhavia diffusa L.	H	5420
	Bougainvillea spectabilis Willd.	C	5441
	Pisonia grandis R. Br.	T	5459
	Phytolaccaceae		
	Rivina humilis L.	H	5507
	Talinaceae		
	Talinum fruticosum (L.) Juss.	H	2160
	Cactaceae		
	Acanthocereus tetragonus (L.) Hummelinck	T	2881
	Opuntia stricta (Haw.) Haw. var. *dillenii* (Ker Gawl.) L. D. Benson	H	2116
	Opuntia ficus-indica (L.) Mill.	H	9393
	Plumbaginaceae		
	Plumbago zeylanica L.	H	2121
	Tamaricaceae		
	Tamarix aphylla (L.) Karsten	T	2195
ASTERIDS			
Cornales	**Cornaceae**		
	Alangium salviifolium (L. f.) Wangerin	T	2174
Ericales	**Balsaminaceae**		
	Impatiens balsamina L.	H	2206
	Lecythidaceae		
	Barringtonia acutangula (L.) Gaertn.	T	2165
	Couroupita guianensis Aubl.	T	2106
	Gustavia superba (Kunth) O. Berg	T	2183
	Primulaceae		
	Jacquinia aculeata (L.) Mez	S	2156
	Sapotaceae		
	Chrysophyllum cainito L.	T	2006
	Madhuca longifolia (L.) J.F. Macbr.	T	2255
	Manilkara zapota (L.) P. Royen	T	2243
	Mimusops elengi L.	T	2003
LAMIDS			
Gentianales	**Apocynaceae**		
	Adenium obesum (Forssk.) Roem. & Schult.	S	2175
	Aganosma dichotoma K. Schum.	C	2054
	Allamanda blanchetii A. DC.	S	2262
	Allamanda cathartica L.	S	2014
	Calotropis gigantea (L.) W. T. Aiton	S	2082
	Catharanthus roseus (L.) G. Don	S	2144
	Cerbera odollam Gaertn.	T	2049
	Hemidesmus indicus (L.) W. T. Aiton	C	2097
	Holarrhena pubescens Wall. ex G. Don	T	2146
	Ichnocarpus frutescens (L.) W. T. Aiton	C	2101
	Nerium oleander L.	S	2053
	Plumeria obtusa L.	T	2122
	Plumeria rubra L.	T	2056
	Rauvolfia tetraphylla L.	S	2055
	Tabernaemontana divaricata (L.) R. Br. ex Roem. & Schult.	S	2137
	Thevetia peruviana (Pers.) K. Schum.	T	2032
	Voacanga grandifolia (Miq.) Rolfe	T	2260
	Wrightia tinctoria (Roxb.) R. Br.	T	9388
	Rubiaceae		
	Catesbaea spinosa L.	S	2181
	Gardenia gummifera L.f.	T	2095
	Guettarda speciosa L.	T	2072
	Hamelia patens Jacq.	S	2209
	Ixora coccinea L.	S	2102
	Morinda pubescens Sm.	T	2110
	Oldenlandia biflora L.	H	2005
	Oldenlandia pterita (Blume) Miq.	H	2212
	Oldenlandia stricta L.	H	2201
	Oldenlandia umbellata L.	H	2007
	Pavetta indica L.	S	2166
	Pentas lanceolata (Forssk.) Deflers	H	2158
	Portlandia grandiflora L.	S	2246
	Spermacoce hispida L.	H	2273
Lamiales	**Acanthaceae**		
	Andrographis echioides (L.) Nees	H	2241

Continued

Table 1. *Continued.*

Superorder/ Order	Family/Species	Habit	Voucher No.
	Aphelandra fascinator Linden & André	H	2172
	Asystasia gangetica (L.) T. Anderson	H	2023
	Avicennia marina (Forssk.) Vierh.	S	2199
	Barleria prionitis L.	S	2077
	Crossandra infundibuliformis (L.) Nees	S	2086
	Ecbolium viride (Forssk.) Alston	S	2090
	Eranthemum roseum (Vahl) R. Br.	S	2258
	Justicia prostrata Gamble	H	2220
	Pseuderanthemum reticulatum Hort. ex Hook.	S	2176
	Ruellia prostrata Poir.	S	2225
	Ruellia tuberosa L.	H	2048
	Thunbergia erecta (Benth.) T. Anderson	S	2026
	Thunbergia grandiflora Roxb.	C	2140
	Lamiaceae		
	Clerodendrum indicum (L.) Kuntze	S	2004
	Clerodendrum sahelangii Koord. ex Bakh.	S	2085
	Clerodendrum splendens G. Don	S	2198
	Hyptis suaveolens (L.) Poit.	S	2232
	Leonotis nepetifolia (L.) W. T. Aiton	H	2159
	Leucas diffusa Benth.	H	2264
	Ocimum tenuiflorum L.	S	2115
	Plectranthus scutellarioides (L.) R. Br.	H	2200
	Premna serratifolia L.	S	2196
	Tectona grandis L. f.	T	2030
	Vitex negundo L.	T	2145
	Volkameria inermis L.	S	2231
	Plantaginaceae		
	Angelonia salicariifolia Humb. & Bonpl.	H	2066
	Russelia equisetiformis Schltdl. & Cham.	C	9389
	Scoparia dulcis L.	H	2128
	Bignoniaceae		
	Crescentia alata Kunth	T	9390
	Handroanthus impetiginosus (Mart. ex DC.) Mattos	T	2253
	Haplophragma adenophyllum (Wall. ex G. Don) Dop	T	2015
	Kigelia africana (Lam.) Benth.	T	2163
	Mansoa alliacea (Lam.) A. H. Gentry	C	2027
	Millingtonia hortensis L. f.	T	2184
	Spathodea campanulata P. Beauv.	T	2130
	Tabebuia aurea (Silva Manso) Benth. & Hook. f. ex S. Moore	T	2134
	Tabebuia pallida (Lindl.) Miers	T	2133
	Tabebuia rosea (Bertol.) DC.	T	9391
	Tecoma capensis (Thunb.) Lindl.	S	2070
	Tecoma stans (L.) Kunth	S	2034
	Tecomella undulata (Sm.) Seem.	T	2024
	Linderniaceae		
	Torenia hirsuta Willd.	H	2046
	Pedaliaceae		
	Pedalium murex L.	H	2248
	Sesamum prostratum Retz.	H	2222
	Oleaceae		
	Jasminum angustifolium (L.) Willd.	C	2103
	Jasminum sambac (L.) Aiton	S	2208
	Nyctanthes arbor-tristis L.	T	2114
	Verbenaceae		
	Citharexylum spinosum L.	T	2149
	Duranta erecta L.	S	2035
	Lantana camara L.	S	2104
	Petrea volubilis L.	C	2178
	Phyla nodiflora (L.) Greene	H	2204
	Stachytarpheta jamaicensis (L.) Vahl	H	2043
	Verbena rigida Spreng.	H	2268
Solanales	**Convolvulaceae**		
	Evolvulus alsinoides (L.) L.	H	2031
	Evolvulus nummularius (L.) L.	H	2036
	Ipomoea batatas (L.) Lam.	H	2205
	Ipomoea sagittifolia Burm. f.	H	2155
	Ipomoea pes-caprae (L.) R. Br.	H	2029
	Ipomoea pes-tigridis L.	H	2230
	Jacquemontia pentanthos (Jacq.) G. Don	C	2028
	Xenostegia tridentata (L.) D. F. Austin & Staples	H	2051
	Solanaceae		
	Brunfelsia americana L.	S	2180
	Capsicum annuum L.	H	2236
	Solanum lycopersicum L.	H	2235
	Physalis minima L.	H	2213
	Solanum melongena L.	H	2233
	Solanum torvum Sw.	S	2234
	Solanum trilobatum L.	S	2219
Boraginales	**Boraginaceae**		
	Cordia dentata Poir.	T	2017
	Cordia sebestena L.	T	2016
	Ehretia laevis Roxb.	T	2025
	Trichodesma indicum (L.) Sm.	S	2018
CAMPANULIDS			
Asterales	**Asteraceae**		
	Blumea mollis (D. Don) Merr.	H	2194
	Chromolaena odorata (L.) R. M. King & H. Rob.	S	2226
	Cosmos caudatus Kunth	H	2270
	Gaillardia pulchella Foug.	H	2269
	Solidago microglossa DC.	H	2164
	Sphagneticola trilobata (L.) Pruski	H	2244
	Tridax procumbens L.	H	2141
	Vernonia cinerea (L.) Less.	H	2143
	Zinnia elegans Jacq.	H	2193
	Goodeniaceae		
	Scaevola taccada (Gaertn.) Roxb.	S	9392
	Campanulaceae		
	Hippobroma longiflora (L.) G. Don	H	2242

Figure 6. Coconut groves.

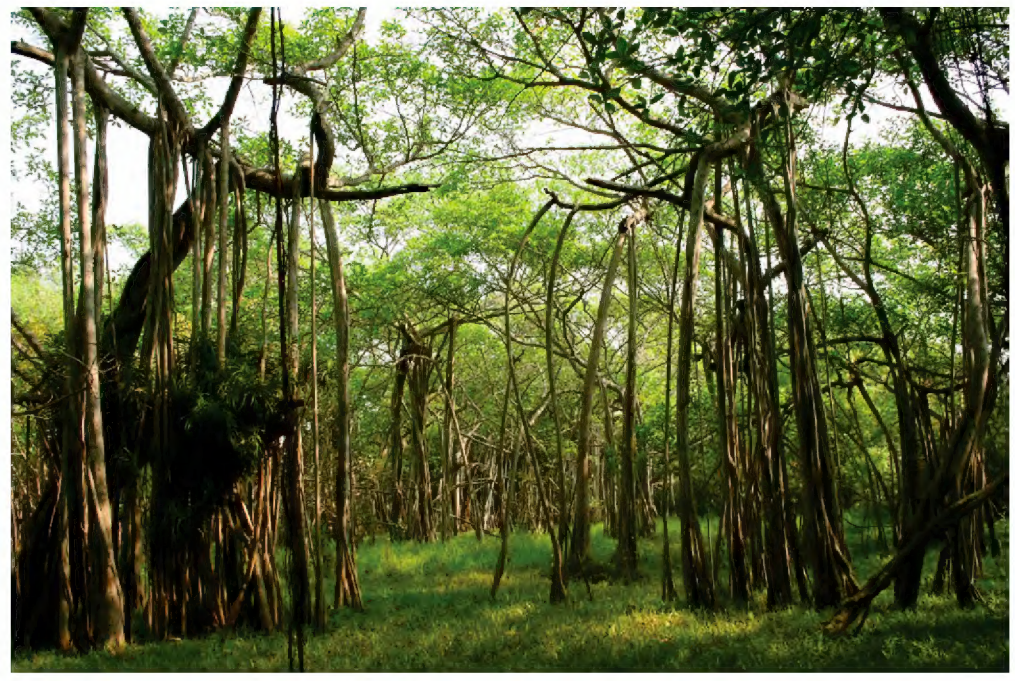

Figure 7. The big banyan tree.

Figure 8. *Nypa fruticans*, a mangrove palm grown in a circular tank.

Some of the noteworthy plants are *Berrya javanica*, *Bismarckia nobilis*, *Brownea grandiceps*, *Brownea macrophylla*, *Catesbaea spinosa*, *Goniothalamus salicinus*, *Gustavia superba*, *Haplophragma adenophyllum*, *Jacquinia aculeata*, *Nypa fruticans*, *Oncoba spinosa*, *Peltophorum africanum*, *Saraca thaipingensis*, *Sterculia apetala*, *Tecomella undulata*, *Triplaris weigeltiana*, and *Voacanga grandifolia*. Fourteen species of palms are reported from the TS campus of which *Corypha macropoda* is a native palm. This campus has an avenue of *Swietenia mahagoni*, planted by representatives of several member countries. The big banyan tree (Figure 7) with branches spanning 75 m from north to south and 51 m from east to west attracts tourists from all parts of the world. This delightful sanatorium can afford shelter for thousands of people and is a nesting place for several birds. The main trunk of this large banyan was uprooted by a cyclone during November 1992. Another plant of interest is the palm, *Nypa fruticans* which is grown in a circular tank (Figure 8). *Nypa fruticans* is a mangrove palm of Andaman and Nicobar Islands, and on the mainland, this palm is recorded only from the TS campus. The sandy and open areas are a home to many naturalized invasive species which include *Prosopis juliflora*, *Tridax procumbens*, *Lantana camara*, *Hyptis suaveolens*, *Antigonon leptopus*, and *Croton bonplantianum*.

Paleotropical elements (66%) dominate the TS campus followed by Neotropical (31%), Holarctic (2%) and Australian (1%) elements (Figure 9). About 16 species are pantropical. Among the paleotropical plants 39 taxa are reported from Indian Region. Of these, eight species are endemic to India namely: *Sansevieria roxburghiana*, *Pterospermum xylocarpum*, *Aganosma dichotoma*, *Wrightia tinctoria*, *Gardenia gummifera*, *Eranthemum roseum*, *Leucas diffusa*, and *Torenia hirsuta*. Twenty-seven taxa belong to Tropical Africa, 37 to Indochinese region, six to Madagascan region, 74 to Indomalesian region and 12 to Malesian region. Most of the Neotropical elements are from Caribbean region. Of the 225 native taxa about 44% are herbs and 35% are trees and most of these native species are seen exclusively in cultivation. Few of the taxa are shown in Figures 10–35.

There are not many changes in the flora of TS when compared with our two phases of studies. *Bauhinia* × *blakeana*, *Bismarckia nobilis*, *Carpentaria acuminata*, *Crescentia alata*, *Majidea zanguebarica* and *Terminalia mantaly* are some of the additions to the TS campus. *Cochlospermum religiosum*, *Dillenia suffruticosa*, *Haematoxylum campechianum*, *Areca triandra*, *Ceiba speciosa*, *Licania platypus*, *Lonchocarpus violaceus* are some of the trees the campus has lost due to natural calamities.

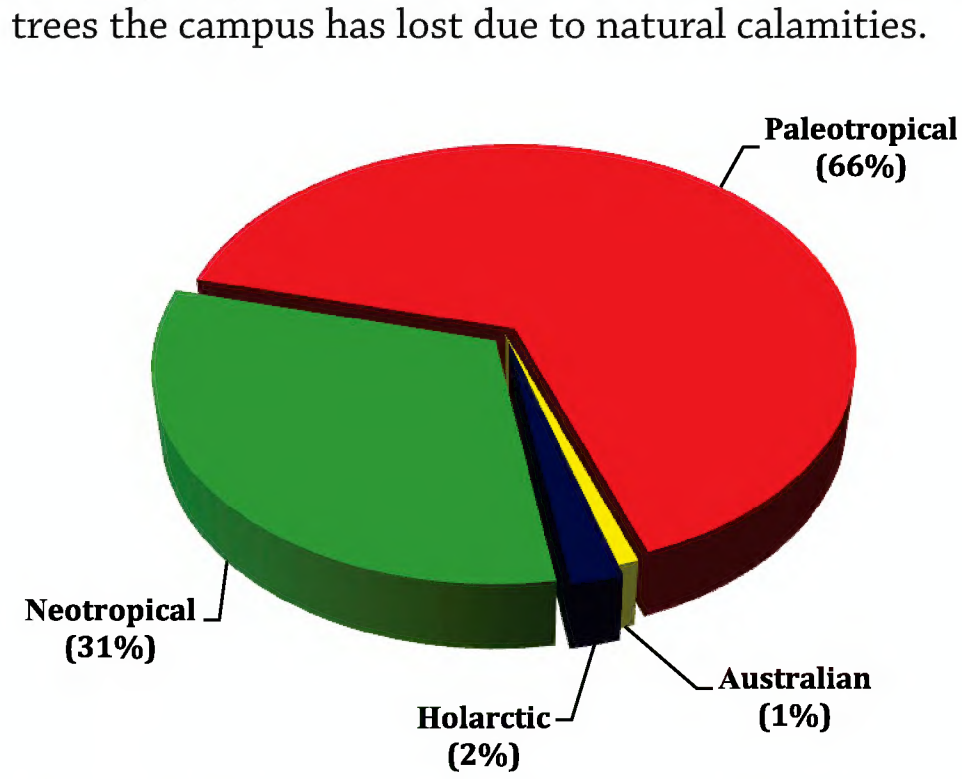

Figure 9. Distribution of species in phytochorionomic kingdoms.

The present study reveals that the TS campus has a rich and diverse exotic flora. Many of the plants occurring in the campus are uncommon. Such a rich and diverse exotic flora exists because of the efforts of the Garden Department, international members, and those who live on the campus. However, composition of the TS flora consists of nearly an equal percentage of exotic and native species. The campus, located in the highly urbanized Adyar region, acts as a crucial green lung space for the area.

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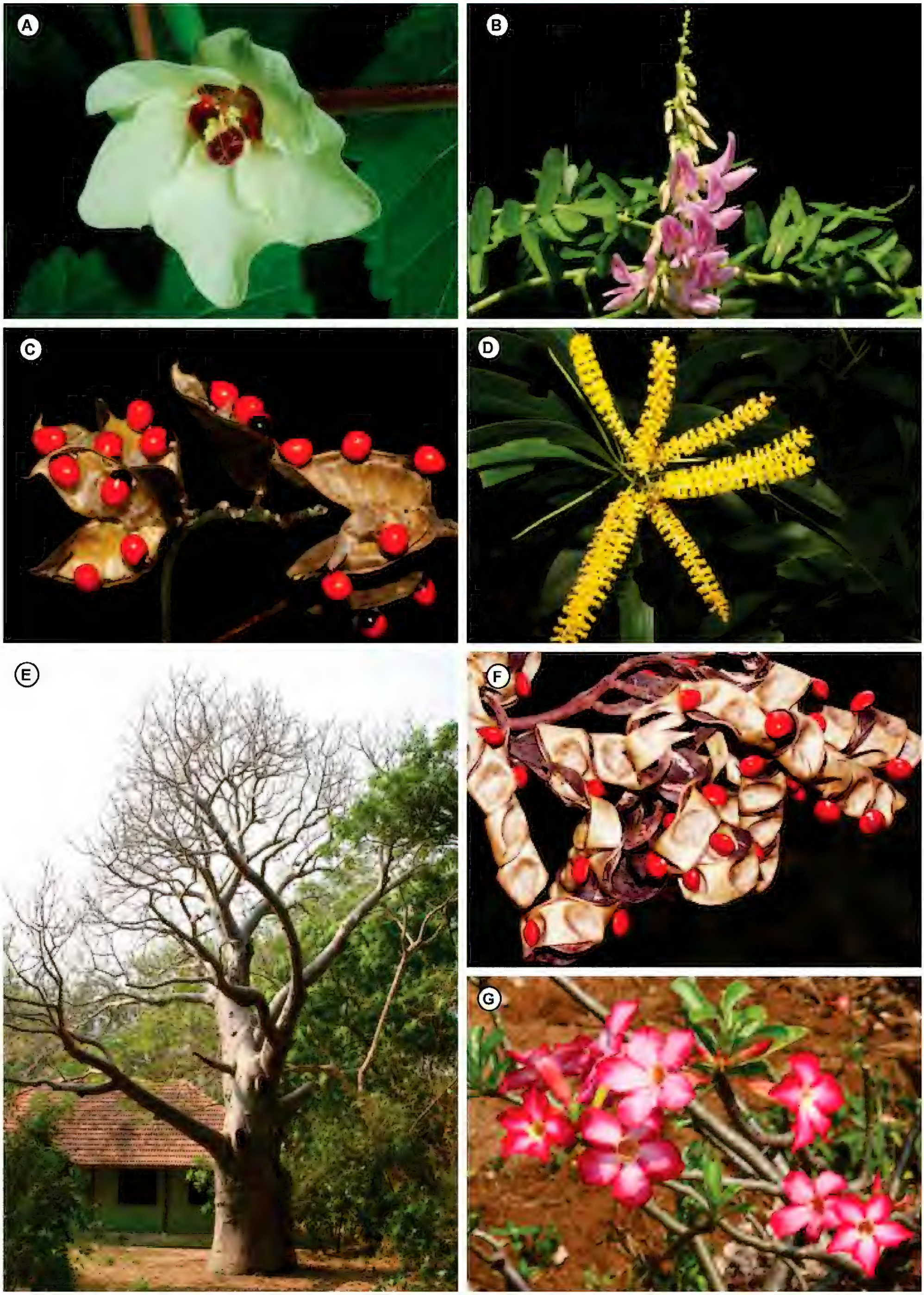

Figure 10. A, *Abelmoschus esculentus*; B, *Abrus precatorius* flowering twig; C, *A.precatorius,* fruiting twig; D, *Acacia auriculiformis*; E, *Adansonia digitata*; F, *Adenanthera pavonina*; G, *Adenium obesum.*

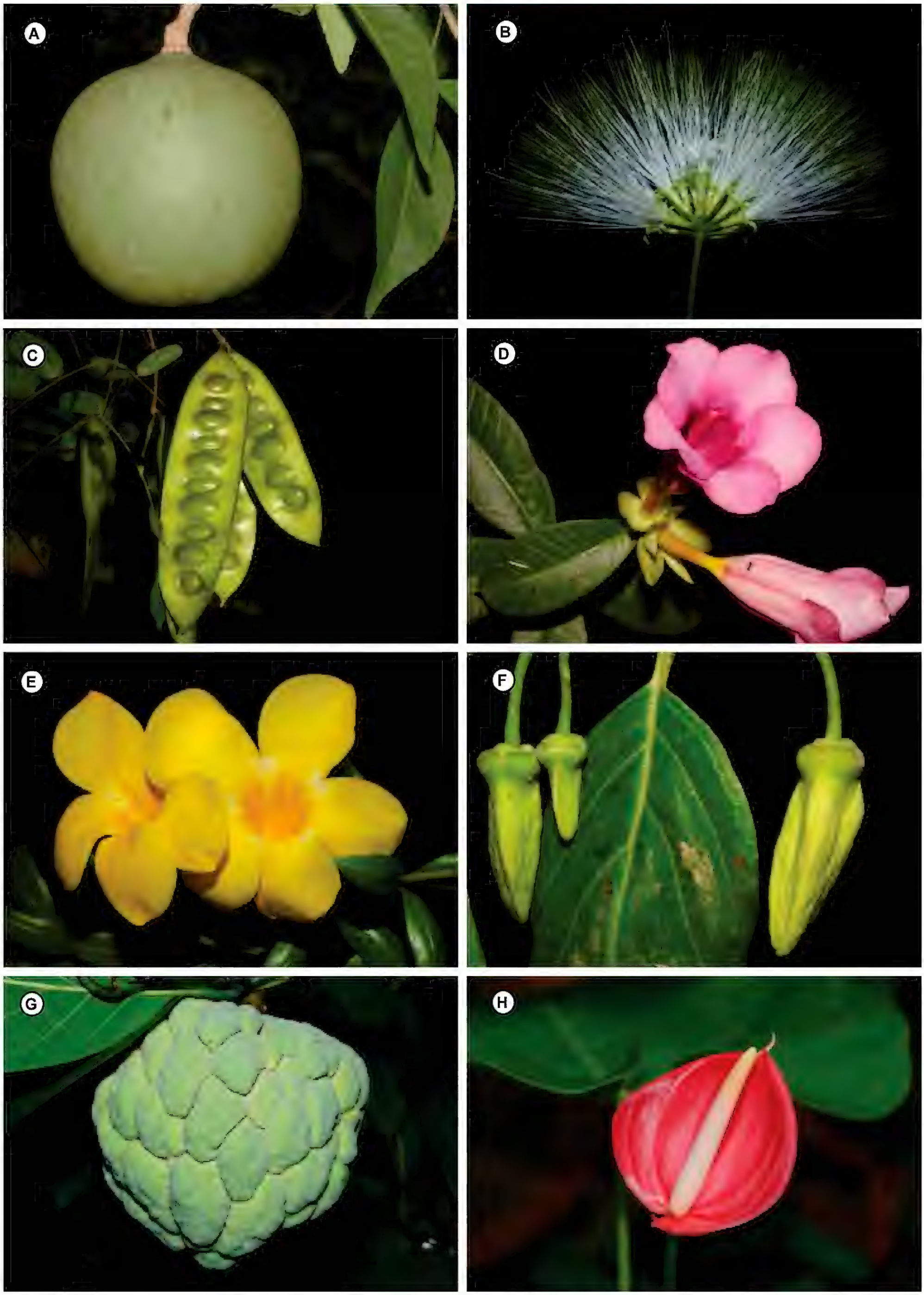

Figure 11. A, *Aegle marmelos*; B, *Albizia lebbeck,* flower; C, *Albizia lebbeck,* fruit; D, *Allamanda blanchetii*; E, *Allamanda cathartica*; F, *Annona squamosa,* flower; G, *Annona squamosa,* fruit; H, *Anthurium andraeanum.*

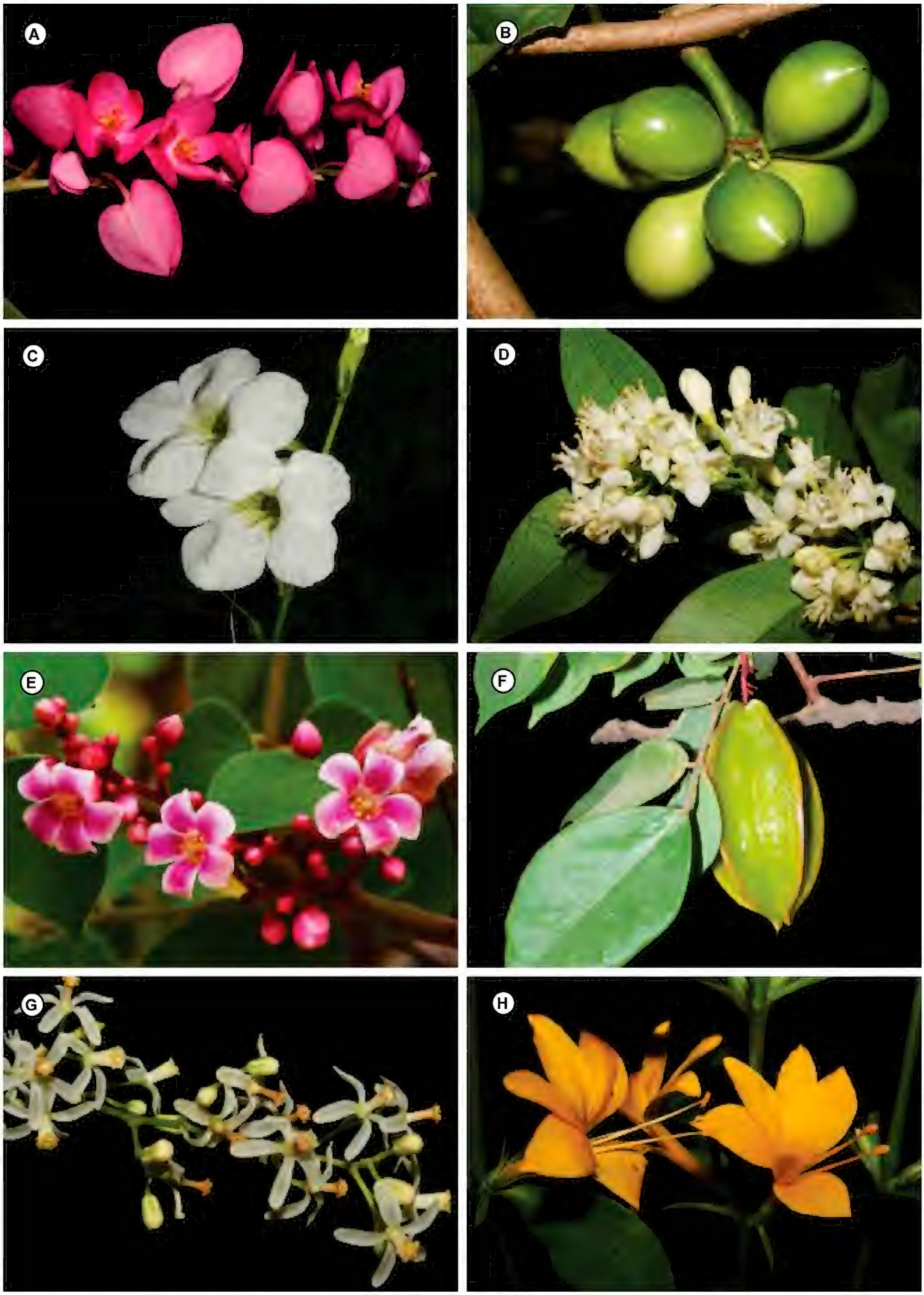

Figure 12. A, *Antigonon leptopus*; B, *Artabotrys hexapetalus*; C, *Asystasia gangetica*; D, *Atalantia monophylla*; E, *Averrhoa carambola,* flower; F, *Averrhoa carambola,* fruit; G, *Azadirachta indica*; H, *Barleria prionitis.*

Figure 13. A, *Barringtonia acutangula*; B, *Bauhinia acuminata*; C, *Bauhinia* × *blakeana*; D, *Bauhinia purpurea*; E, *Bauhinia tomentosa*; F, *Berrya cordifolia*; G, *Berrya javanica*; H, *Bismarckia nobilis.*

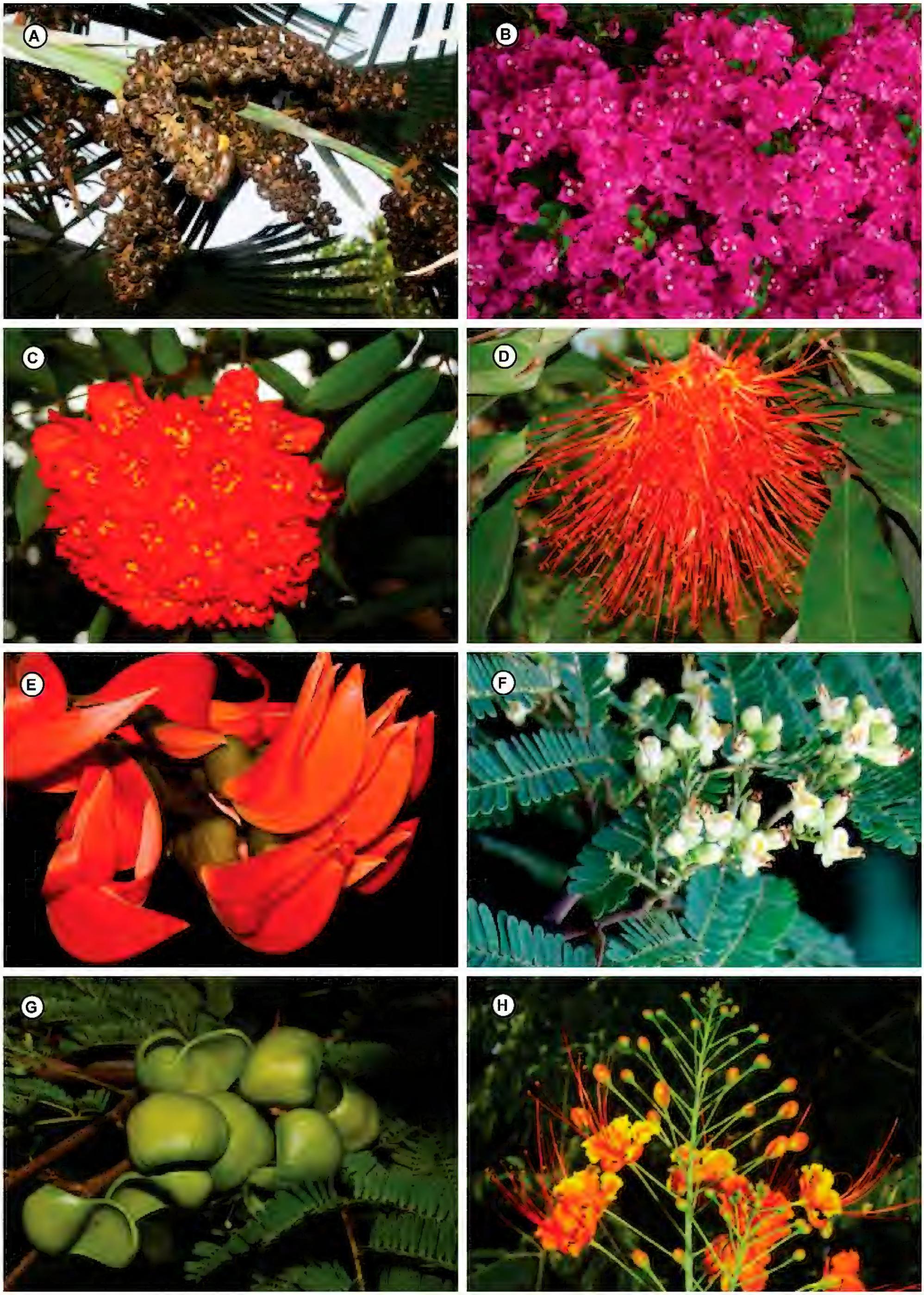

Figure 14. A, *Bismarckia nobilis,* fruit; B, *Bougainvillea spectabilis*; C, *Brownea grandiceps*; D, *Brownea macrophylla*; E, *Butea monosperma*; F, *Caesalpinia coriaria,* flower; G, *Caesalpinia coriaria*, fruit; H, *Caesalpinia pulcherrima*.

Figure 15. A, *Calliandra haematocephala*; B, *Callistemon citrinus*; C, *Calotropis gigantea*, flower; D, *Calotropis gigantea,* fruit; E, *Carpentaria acuminata*; F, *Cassia fistula*; G, *Cassia javanica*; H, *Cassia javanica* L. subsp. *nodosa* .

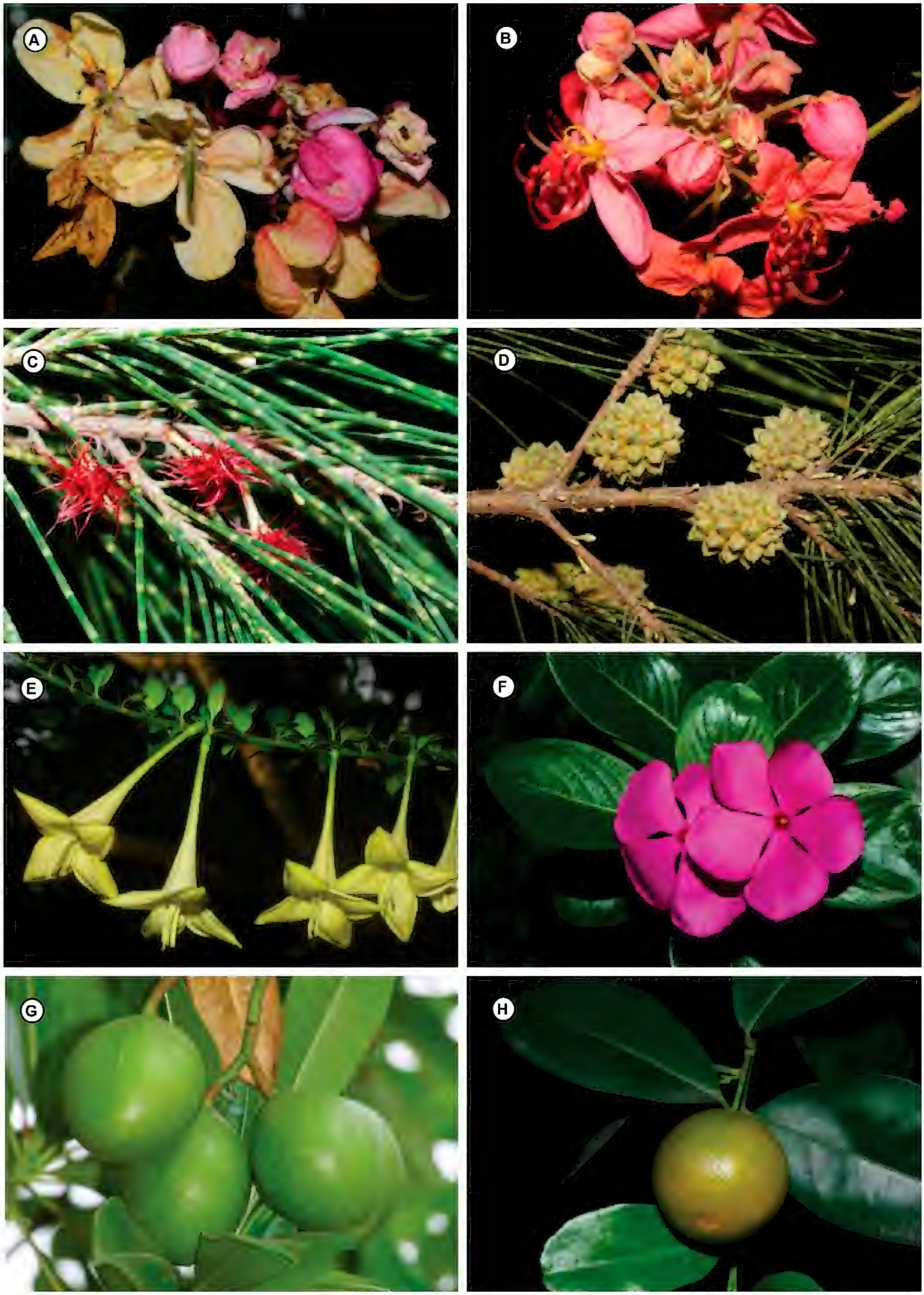

Figure 16. A, *Cassia renigera*; B, *Cassia roxburghii*; C, *Casuarina equisetifolia,* flower; D, *Casuarina equisetifolia*, fruits; E, *Catesbaea spinosa*; F, *Catharanthus roseus*; G, *Cerbera odollam*; H, *Citrofortunella microcarpa.*

Figure 17. A, *Citrus aurantifolia*; B, *Citrus medica*; C, *Clitoria ternatea*; D, *Combretum indicum*; E, *Cordia dentata*; F, *Couroupita guianensis,* fruit; G, *Cordia sebestena.*

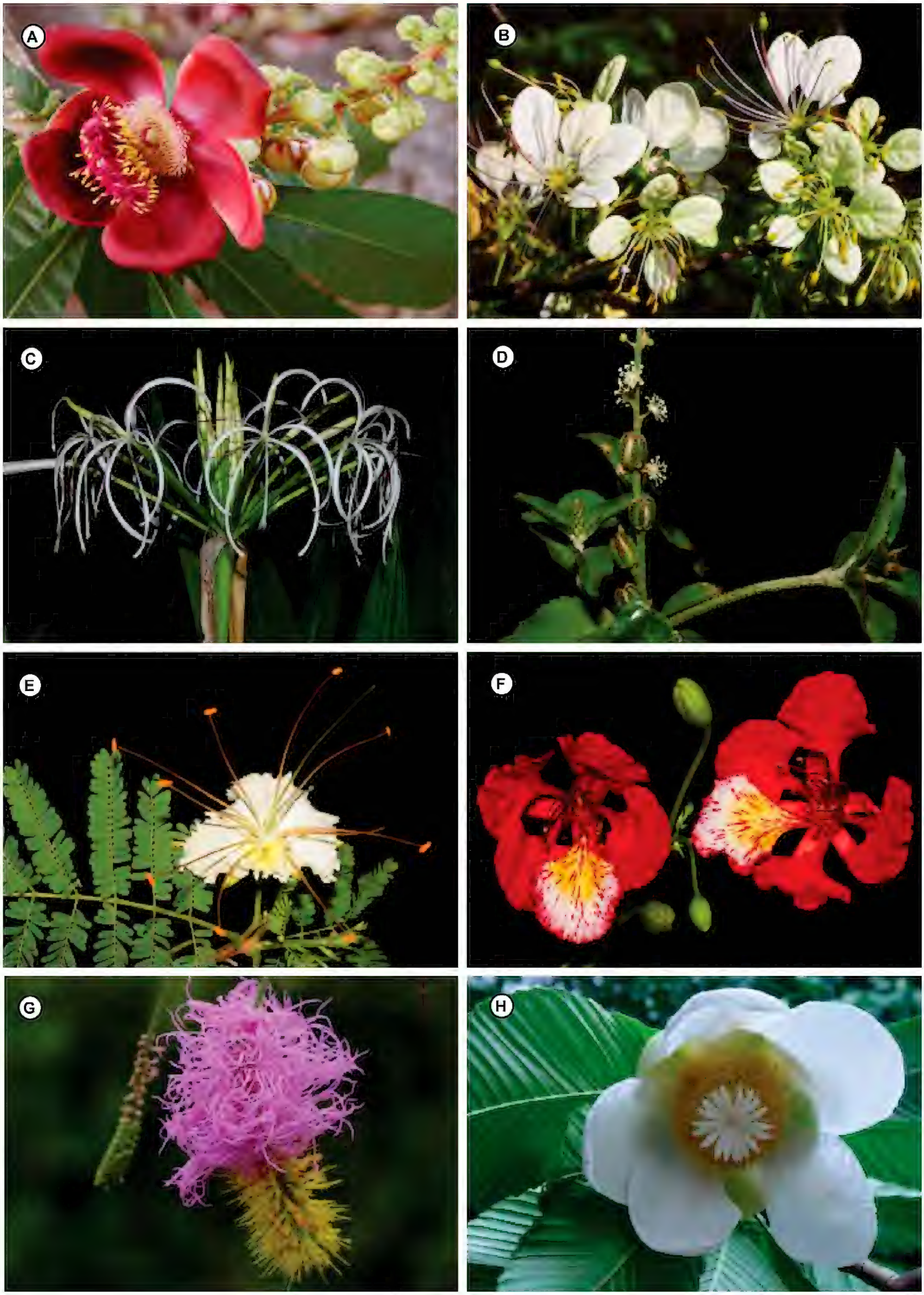

Figure 18. A, *Couroupita guianensis*, flower; B, *Crataeva adansonii* subsp. *odora;* C, *Crinum asiaticum*; D, *Croton bonplandianus*; E, *Delonix elata*; F, *Delonix regia*; G, *Dichrostachys cinerea*; H, *Dillenia indica.*

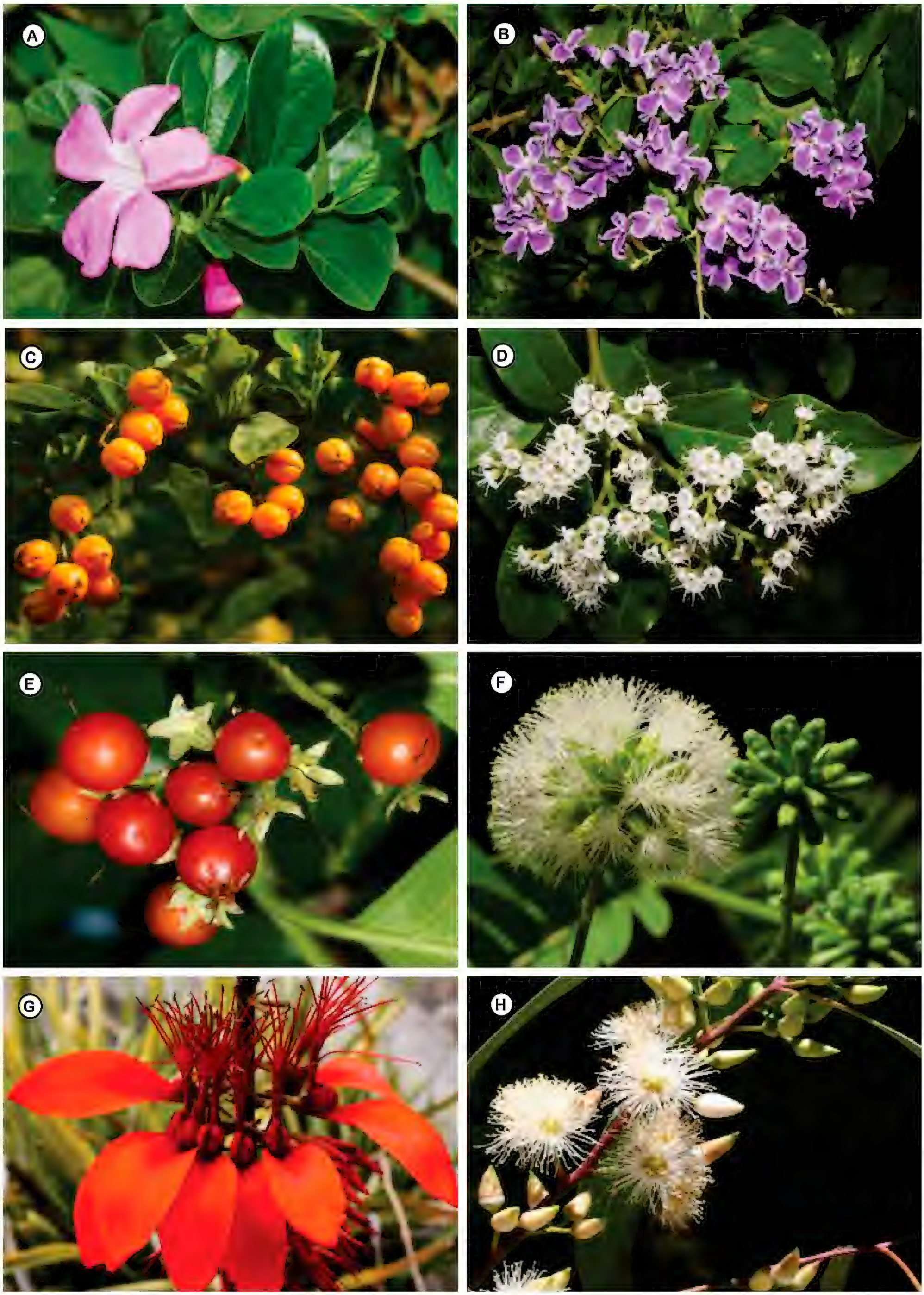

Figure 19. A, *Distictis* × *riversii*; B, *Duranta erecta*, flower; C, *Duranta erecta*, fruit; D, *Ehretia laevis*, flower; E, *Ehretia laevis*, fruit; F, *Enterolobium cyclocarpum*; G, *Erythrina variegata*; H, *Eucalyptus tereticornis*.

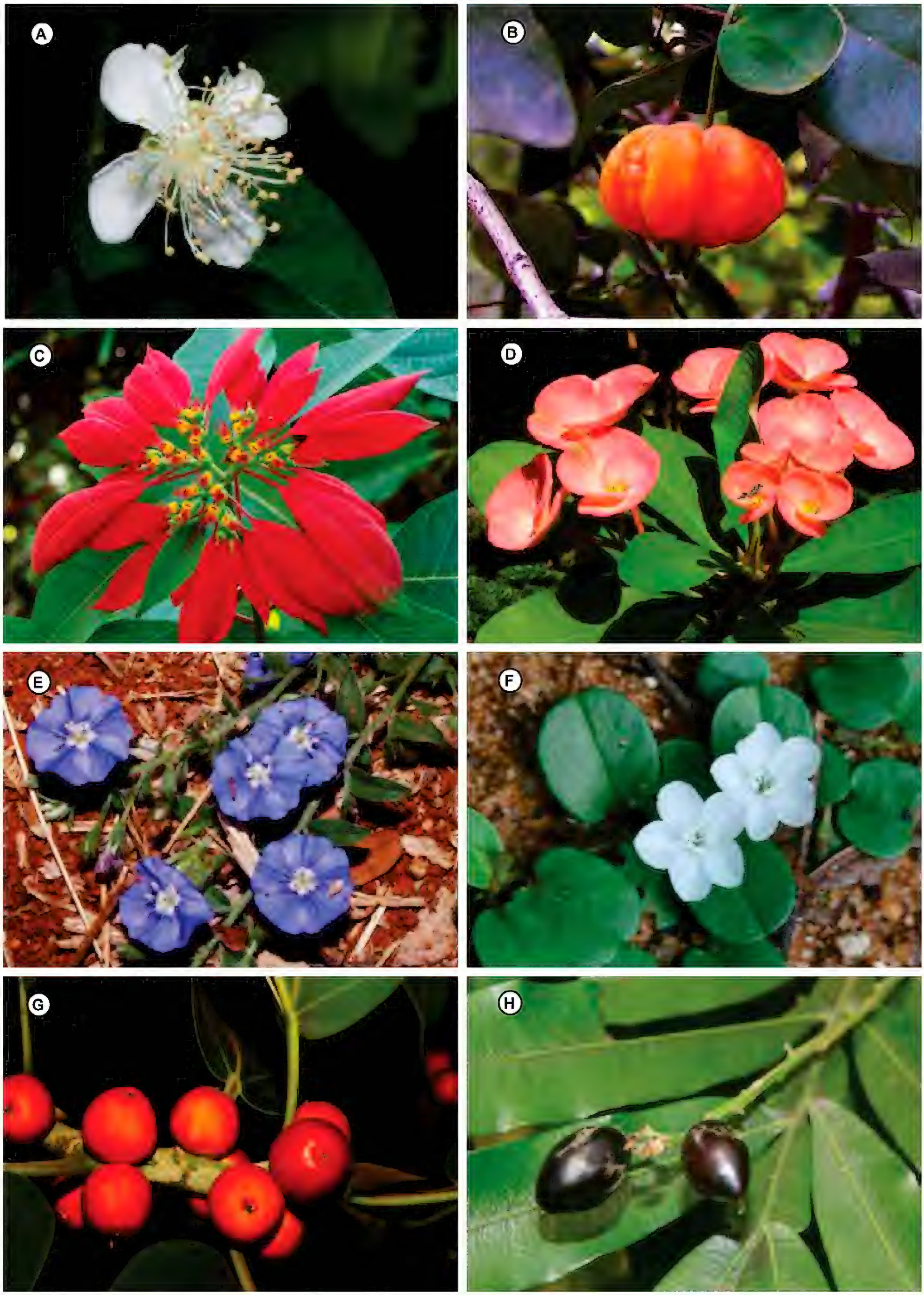

Figure 20. A, *Eugenia uniflora*, flower; B, *Eugenia uniflora*, fruit; C, *Euphorbia pulcherrima*; D, *Euphorbia milii*; E, *Evolvulus alsinoides*; F, *Evolvulus nummularius*; G, *Ficus benghalensis*; H, *Filicium decipiens.*

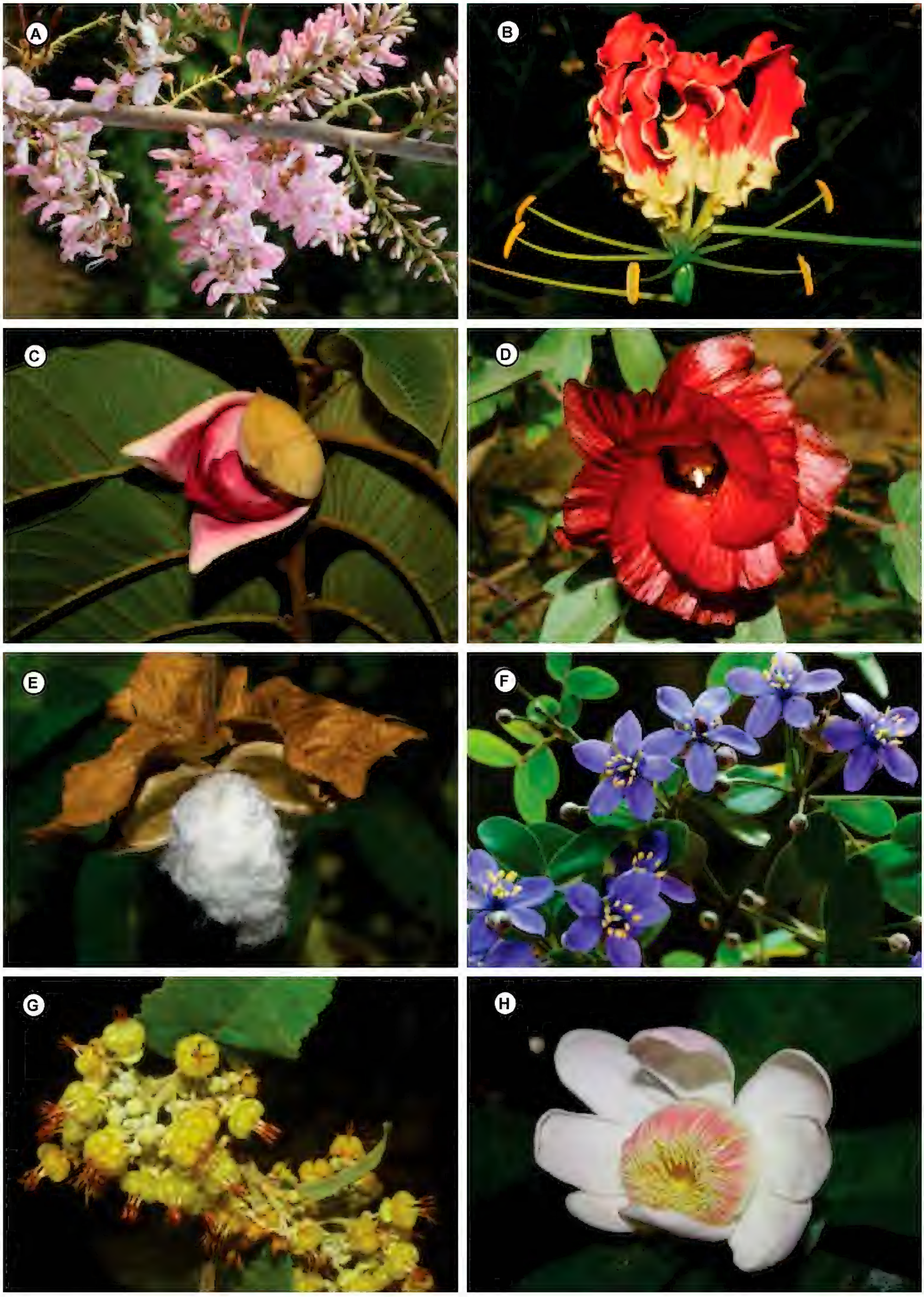

Figure 21. A,*Gliricidia sepium*; B, *Gloriosa superba*; C, *Goniothalamus salicinus*; D, *Gossypium arboretum,* flower; E, *Gossypium arboreum*, fruit; F, *Guaiacum officinale*; G, *Guazuma ulmifolia*; H, *Gustavia superba.*

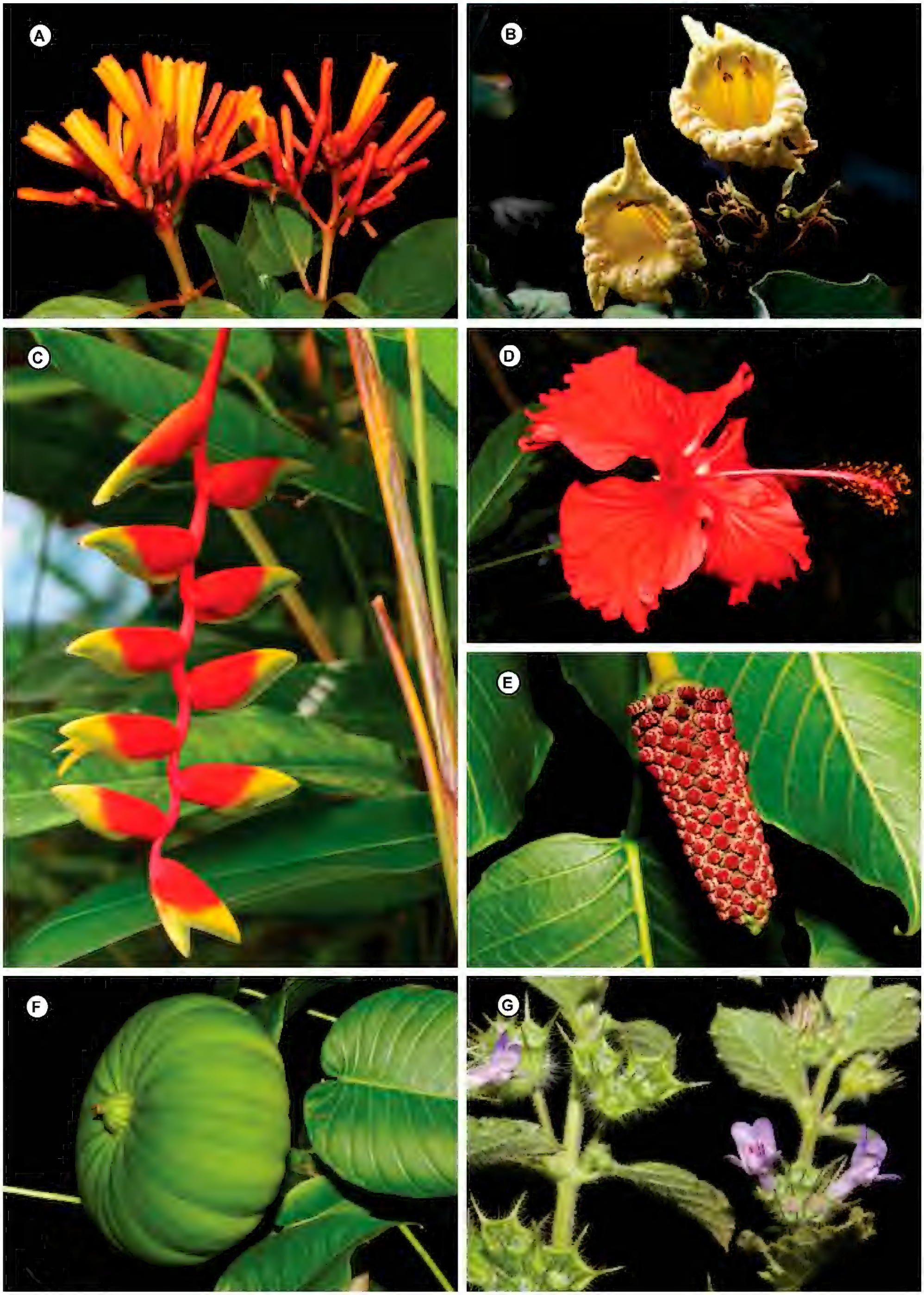

Figure 22. A, *Hamelia patens*; B, *Haplophragma adenophyllum*; C, *Heliconia psittacorum*; D, *Hibiscus rosa-sinensis*; E, *Hura crepitans,* male flower; F, *Hura crepitans*, fruit; G, *Hyptis suaveolens.*

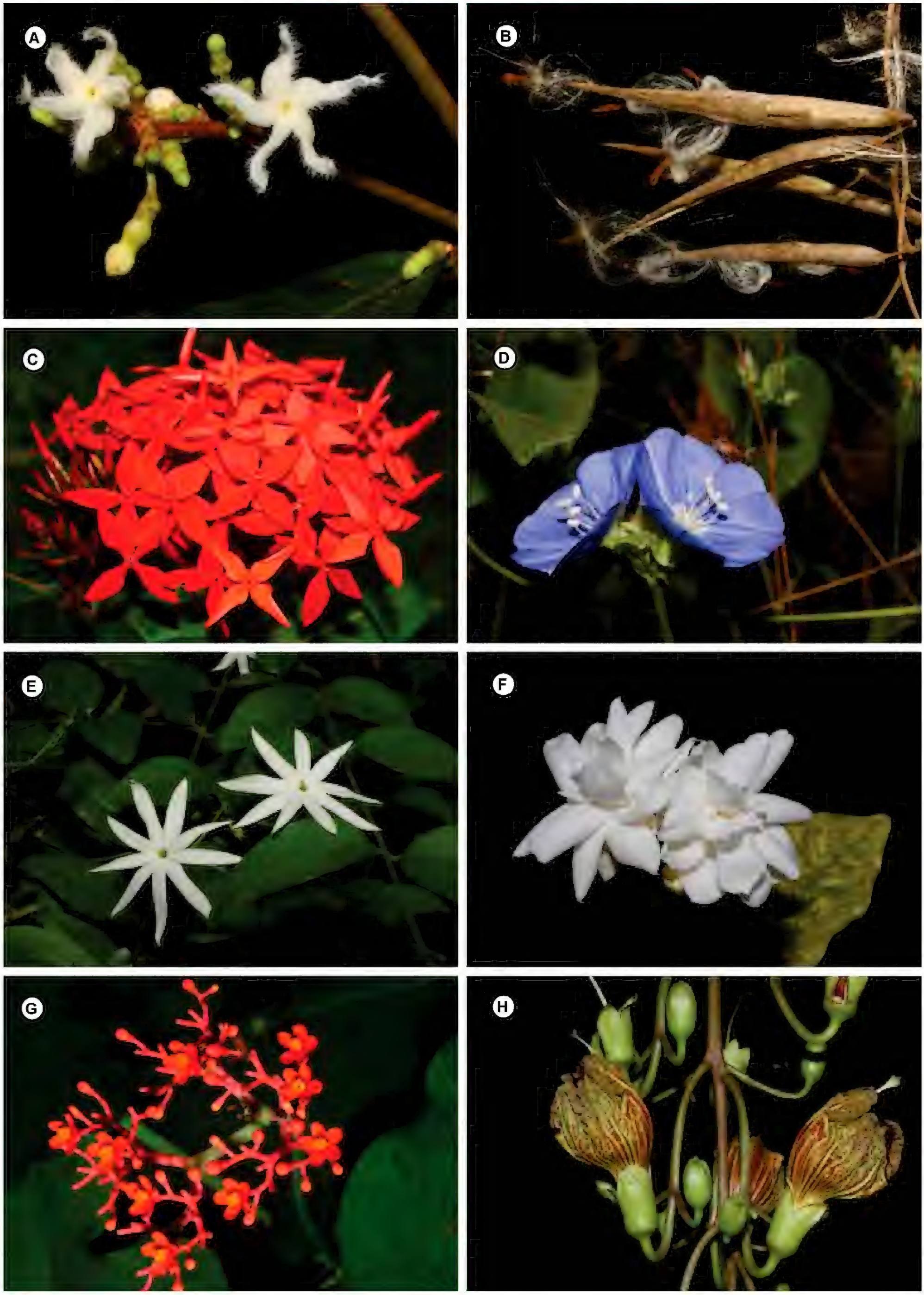

Figure 23. A, *Ichnocarpus frutescens,* flower; B, *Ichnocarpus frutescens,* dispersed fruits; C, *Ixora coccinea*; D, *Jacquemontia pentanthos*; E, *Jasminum angustifolium*; F, *Jasminum sambac*; G, *Jatropha podagrica*; H, *Kigelia africana.*

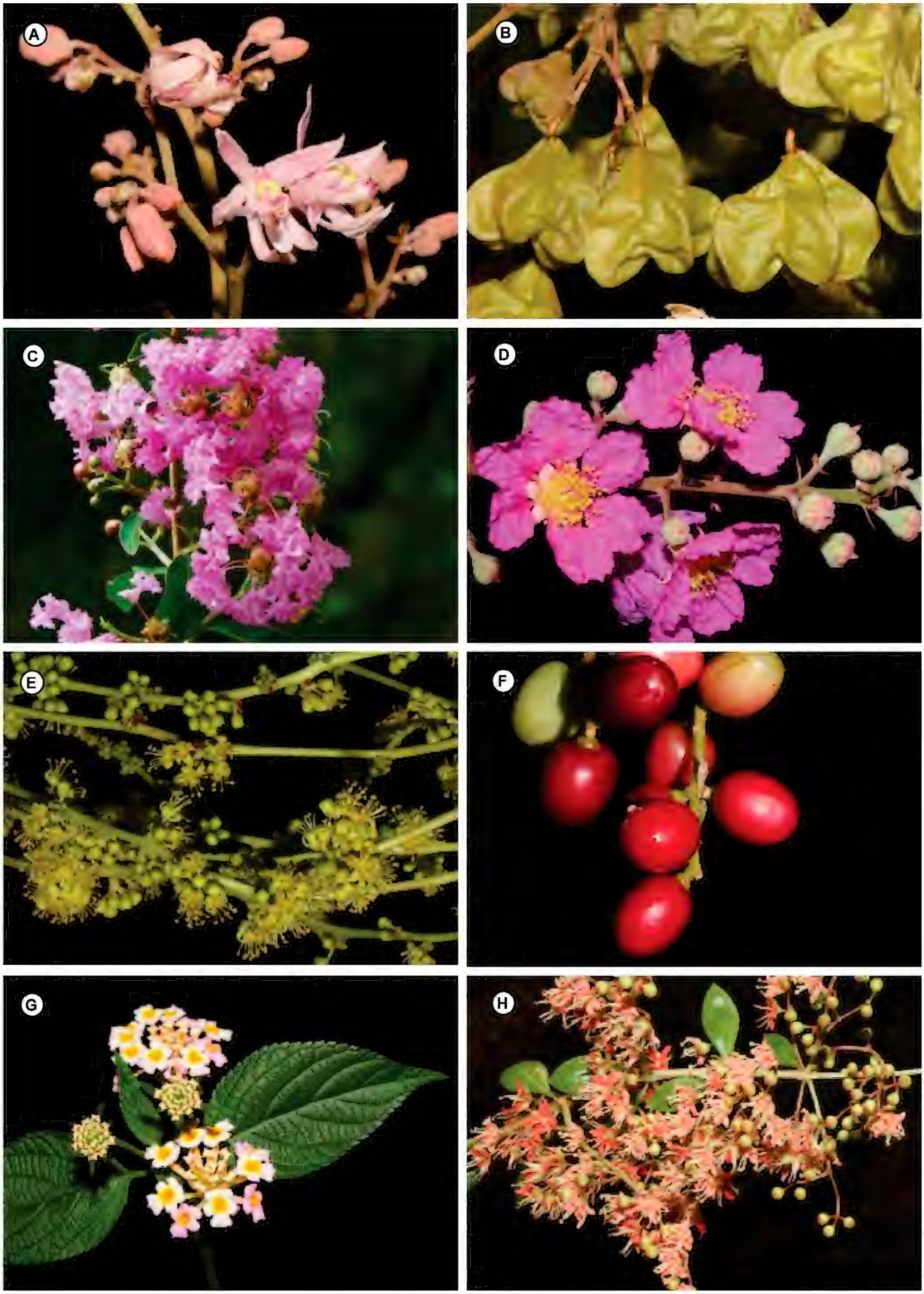

Figure 24. A, *Kleinhovia hospita,* flower; B, *Kleinhovia hospita*, fruit; C, *Lagerstroemia indica*; D, *Lagerstroemia speciosa*; E, *Lannea coromandelica*, flower; F, *Lannea coromandelica*, fruits; G, *Lantana camara*; H, *Lawsonia inermis.*

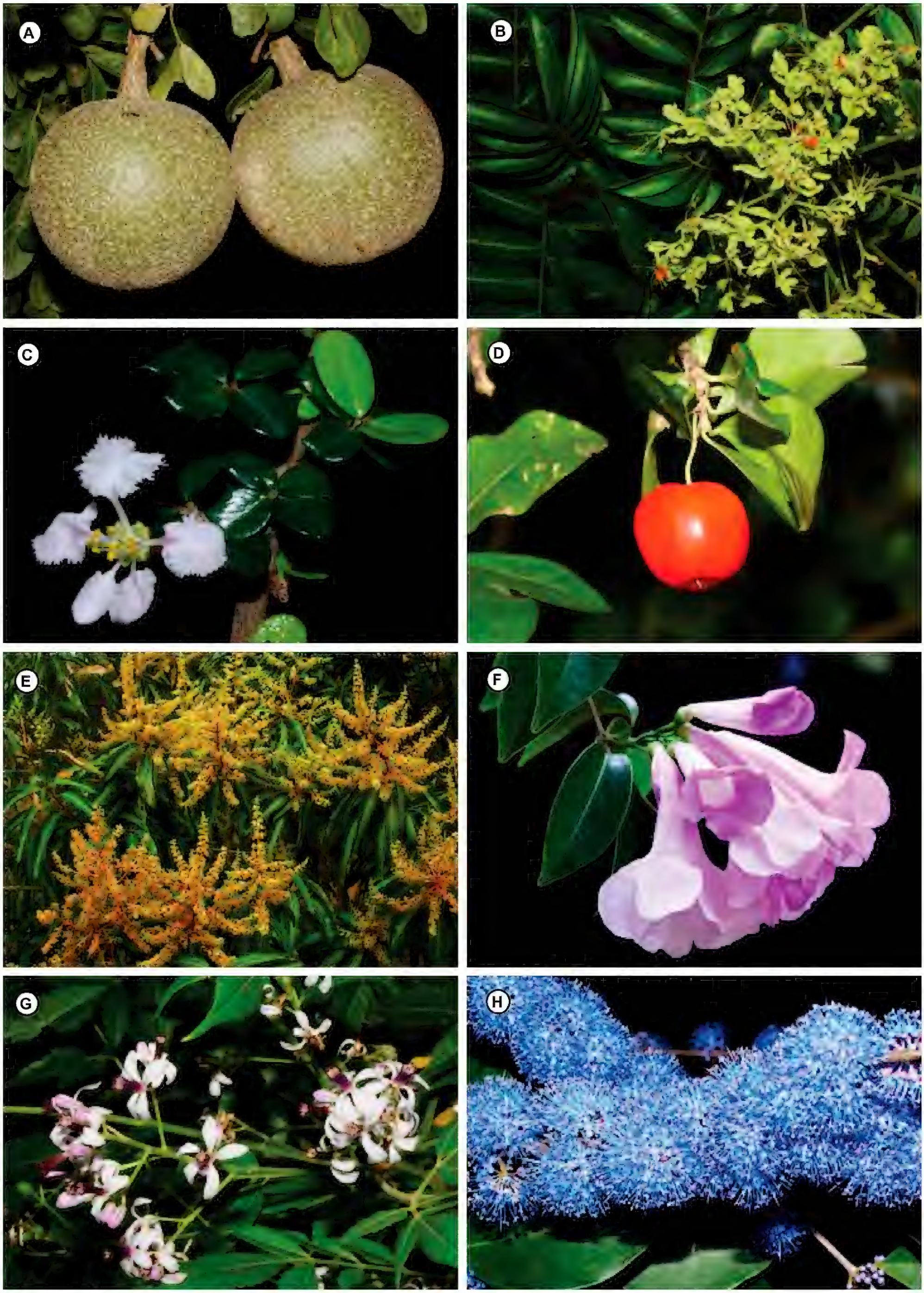

Figure 25. A, *Limonia acidissima*; B, *Majidea zanguebarica*; C, *Malpighia glabra,* flower; D, *Malpighia glabra*, fruit; E, *Mangifera indica,* fruit; F, *Mansoa alliacea*; G, *Melia azedarach*; H, *Memecylon umbellatum.*

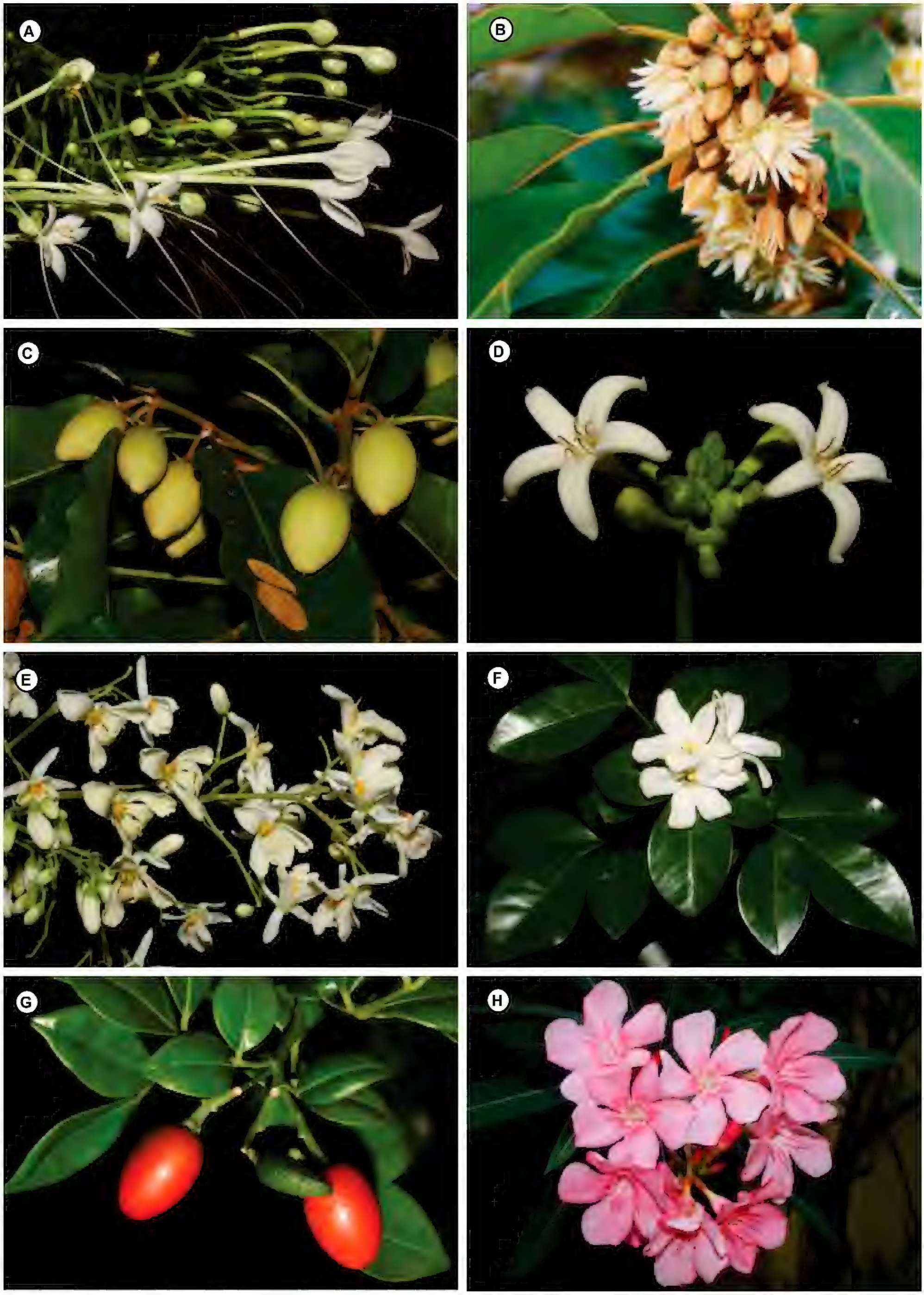

Figure 26. A, *Millingtonia hortensis*; B, *Mimusops elengi,* flower; C, *Mimusops elengi,* fruit; D, *Morinda pubescens*; E, *Moringa oleifera*; F, *Murraya paniculata,* flower; G, *Murraya paniculata,* fruits; H, *Nerium oleander.*

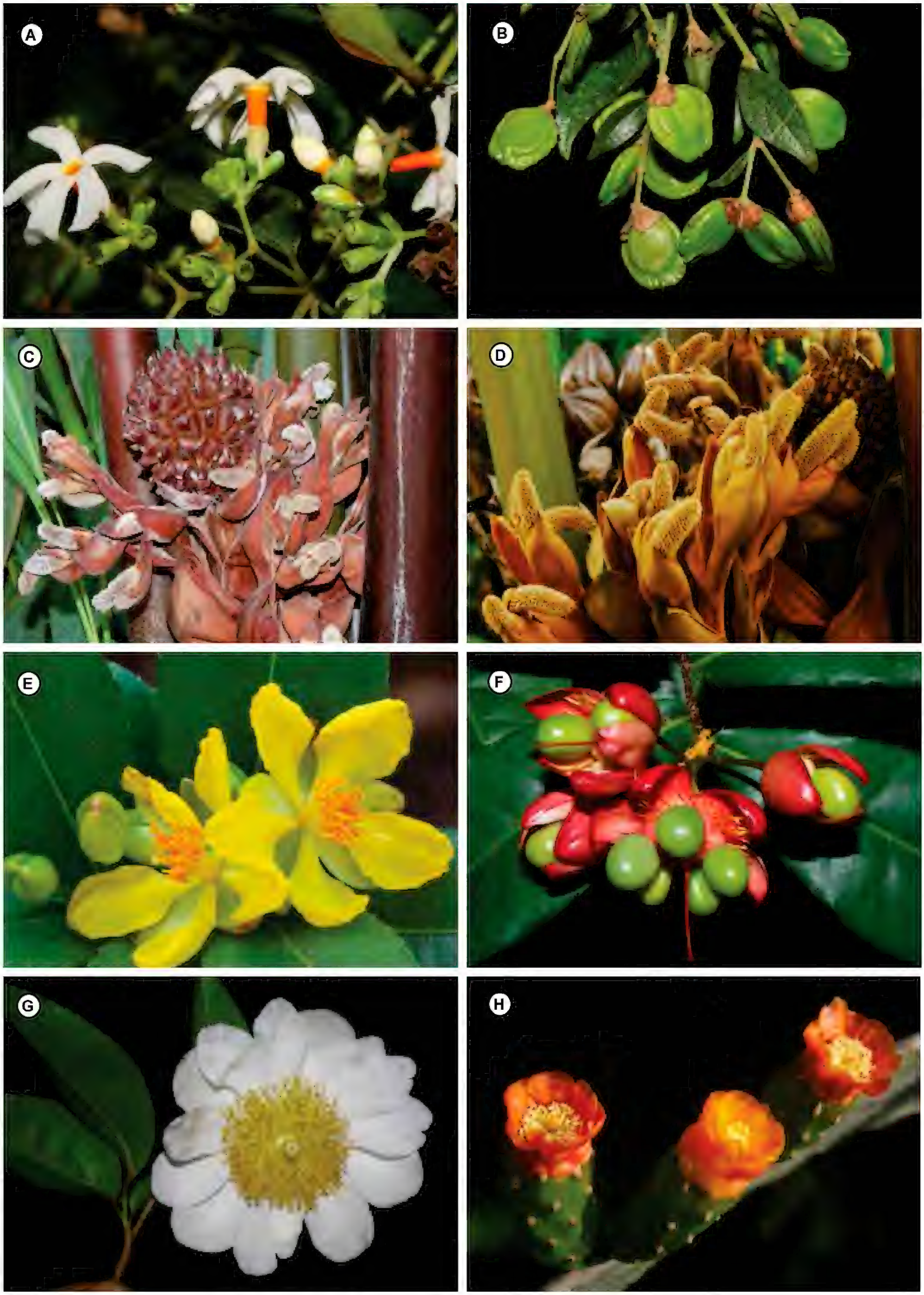

Figure 27. A, *Nyctanthes arbor-tristis,* flower; B, *Nyctanthes arbor-tristis,* fruits; C, *Nypa fruticans,* male; D, *Nypa fruticans,*female; E, *Ochna jabotapita,* flower; F, *Ochna jabotapita,* fruits; G, *Oncoba spinosa*; H, *Opuntia ficus-indica.*

Figure 28. A, *Pamburus missionis*; B, *Pedalium murex*; C, *Peltophorum africanum*; D, *Peltophorum pterocarpum*; E, *Pentas lanceolata*; F, *Petrea volubilis*; G, *Plumeria obtusa*; H, *Plumeria rubra.*

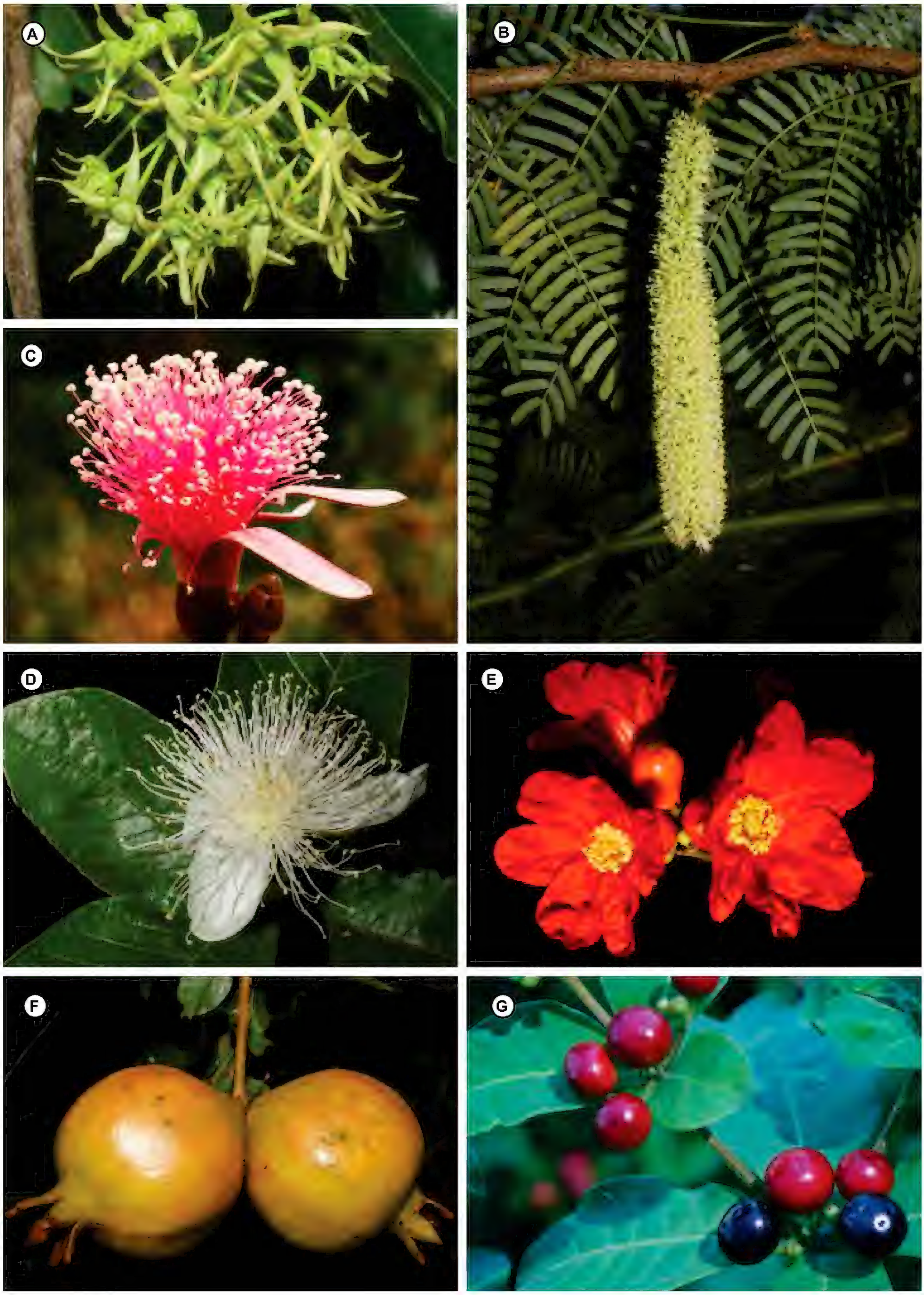

Figure 29. A, *Polyalthia longifolia*; B, *Prosopis juliflora*; C, *Pseudobombax ellipticum*; D, *Psidium guajava*; E, *Punica granatum*, flower; F, *Punica granatum*, fruits; G, *Rauvolfia tetraphylla*.

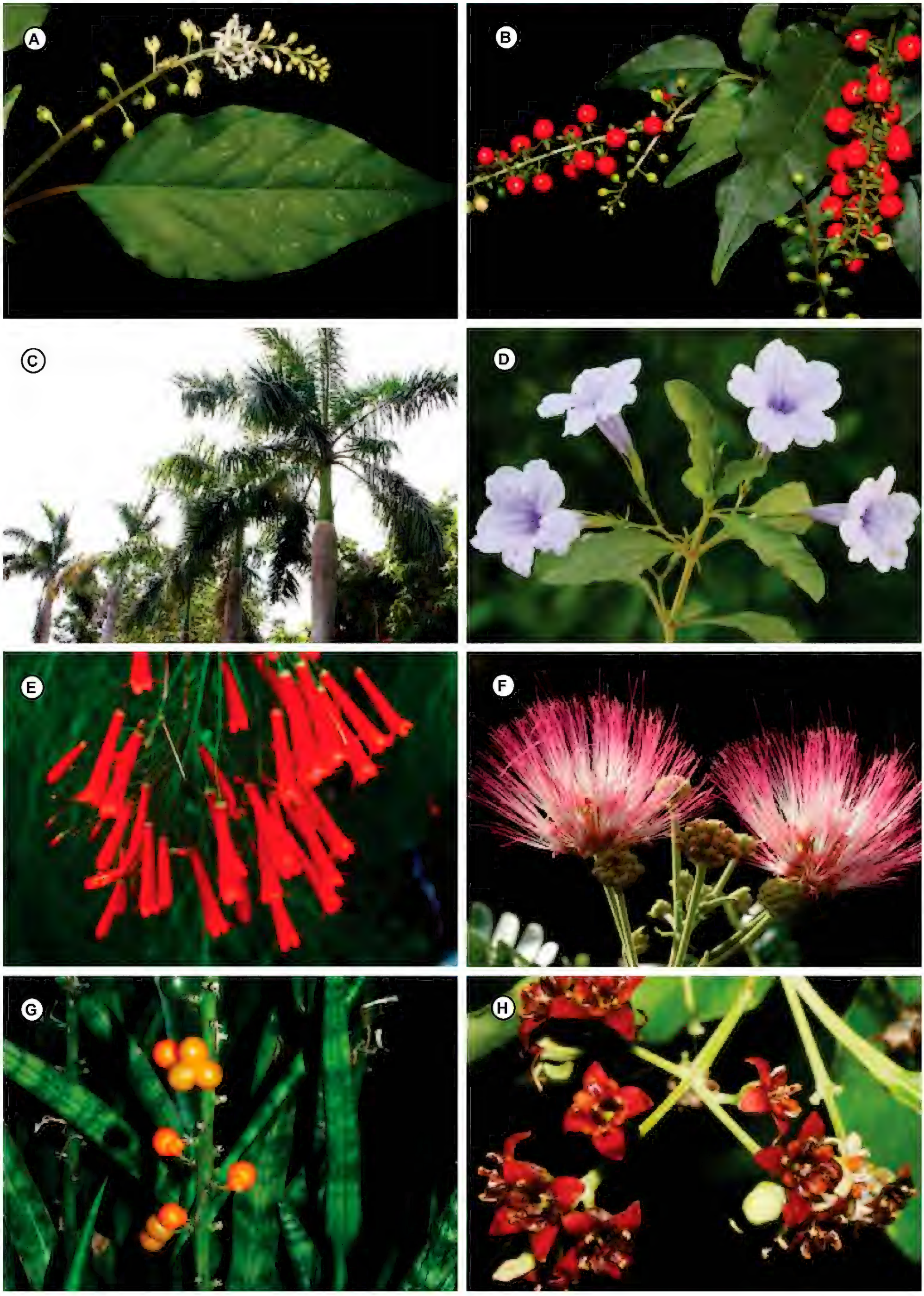

Figure 30. A, *Rivina humilis,* flower; B, *Rivina humilis,* fruit; C, *Roystonea regia*; D, *Ruellia tuberosa*; E, *Russelia equisetiformis*; F, *Samanea saman*; G, *Sansevieria roxburghiana*; H, *Santalum album.*

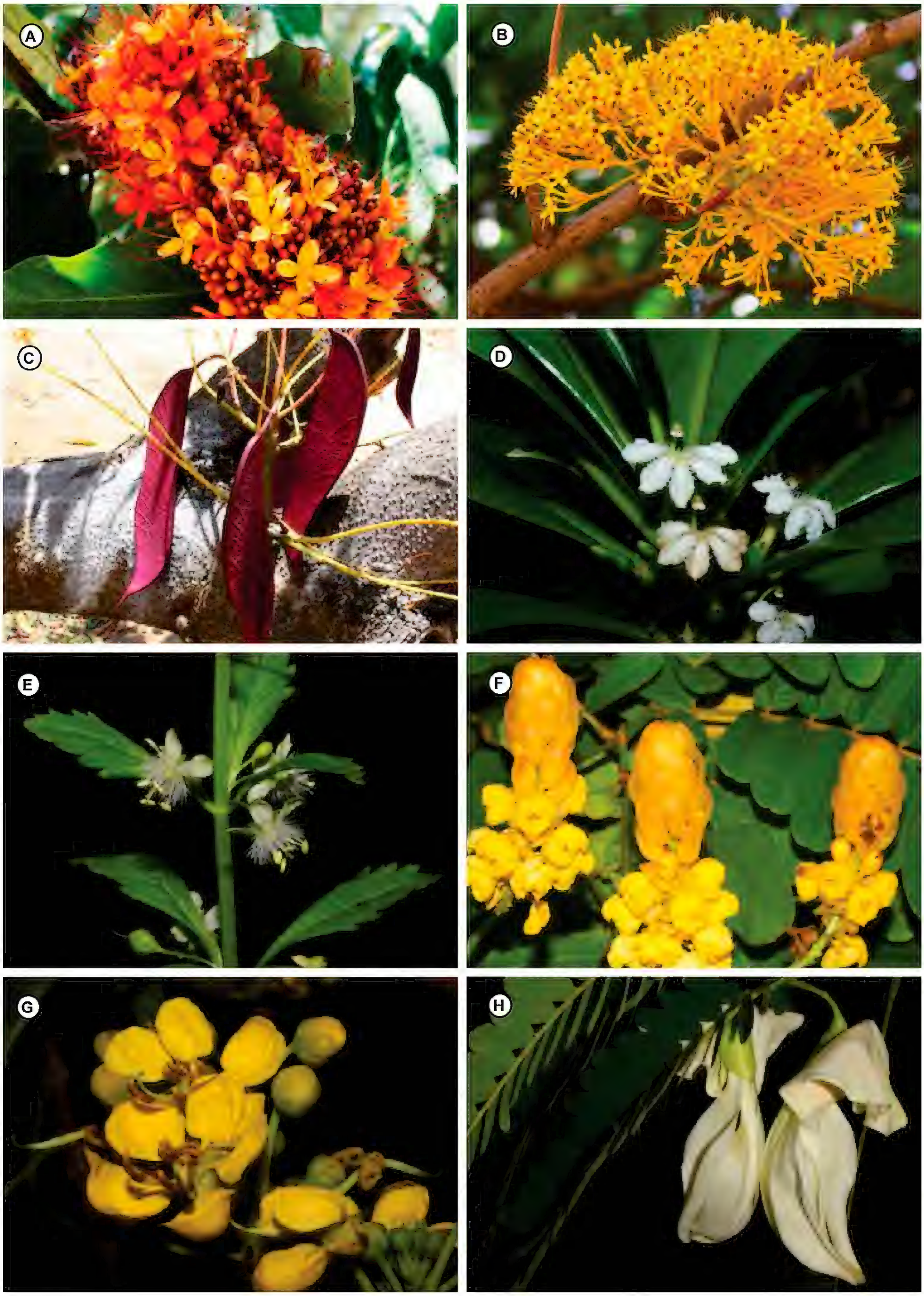

Figure 31. A, *Saraca asoca*; B, *Saraca thaipingensis,* flower; C, *Saraca thaipingensis,* pod; D, *Scaevola taccada*; E, *Scoparia dulcis*; F, *Senna alata*; G, *Senna siamea*; H, *Sesbania grandiflora.*

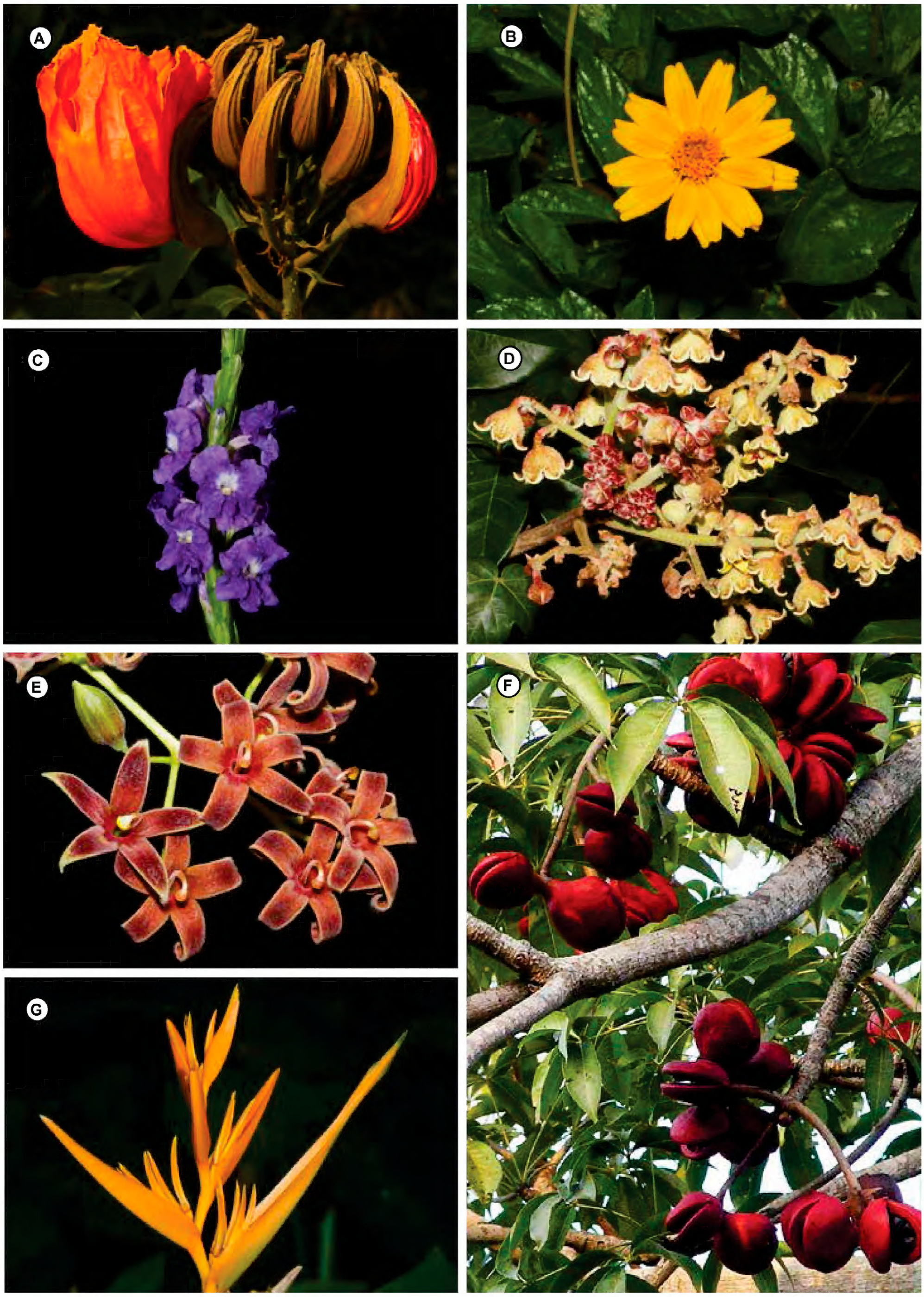

Figure 32. A, *Spathodea campanulata*; B, *Sphagneticola trilobata*; C, *Stachytarpheta jamaicensis*; D, *Sterculia apetala*; E, *Sterculia foetida*, flower; F, *Sterculia foetida*, fruits; G, *Strelitzia reginae.*

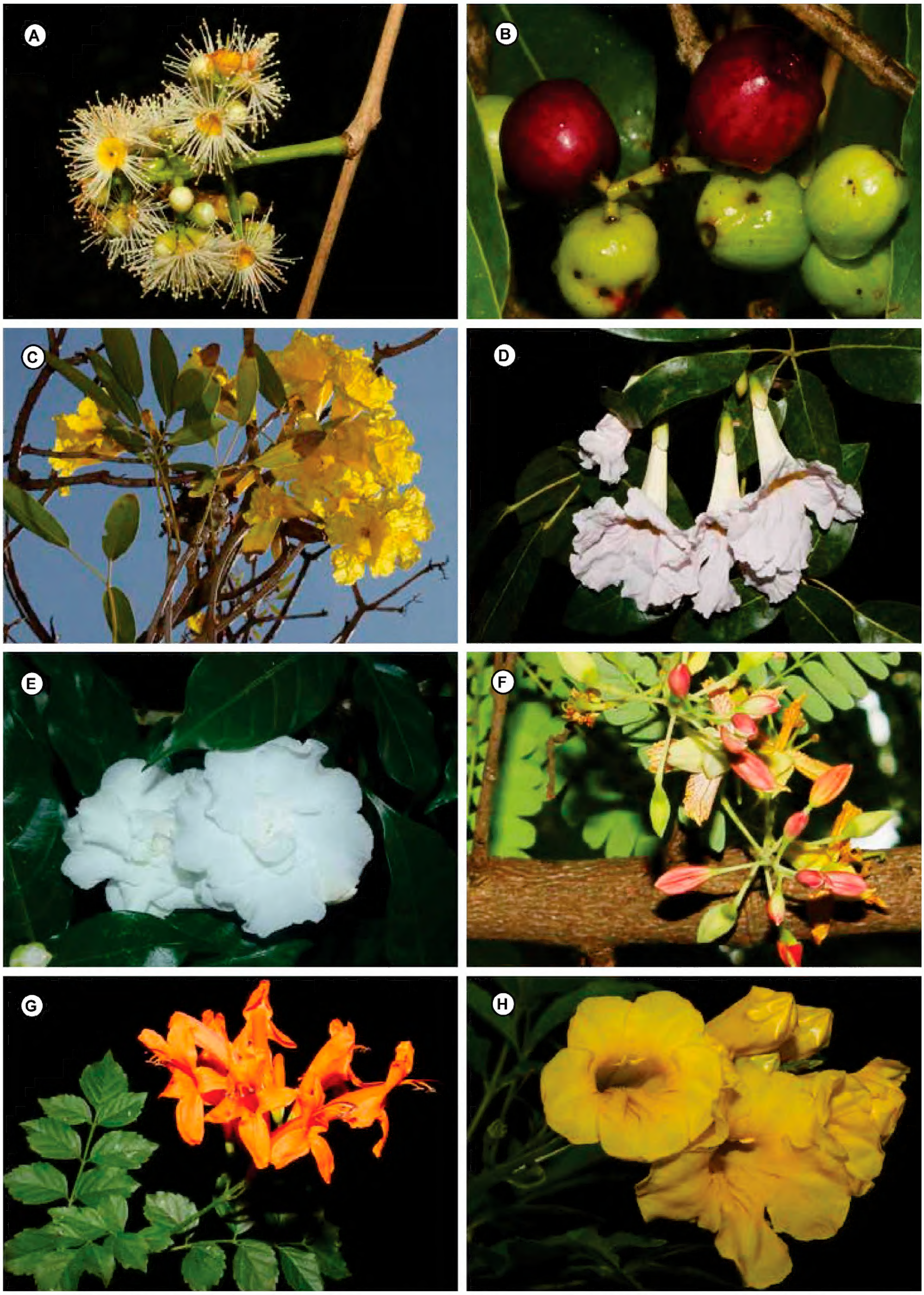

Figure 33. A, *Syzygium cumini*, flower; B, *Syzygium cumini*, fruits; C, *Tabebuia aurea*; D, *Tabebuia rosea*; E, *Tabernaemontana divaricata*; F, *Tamarindus indica*; G, *Tecoma capensis*; H, *Tecoma stans*.

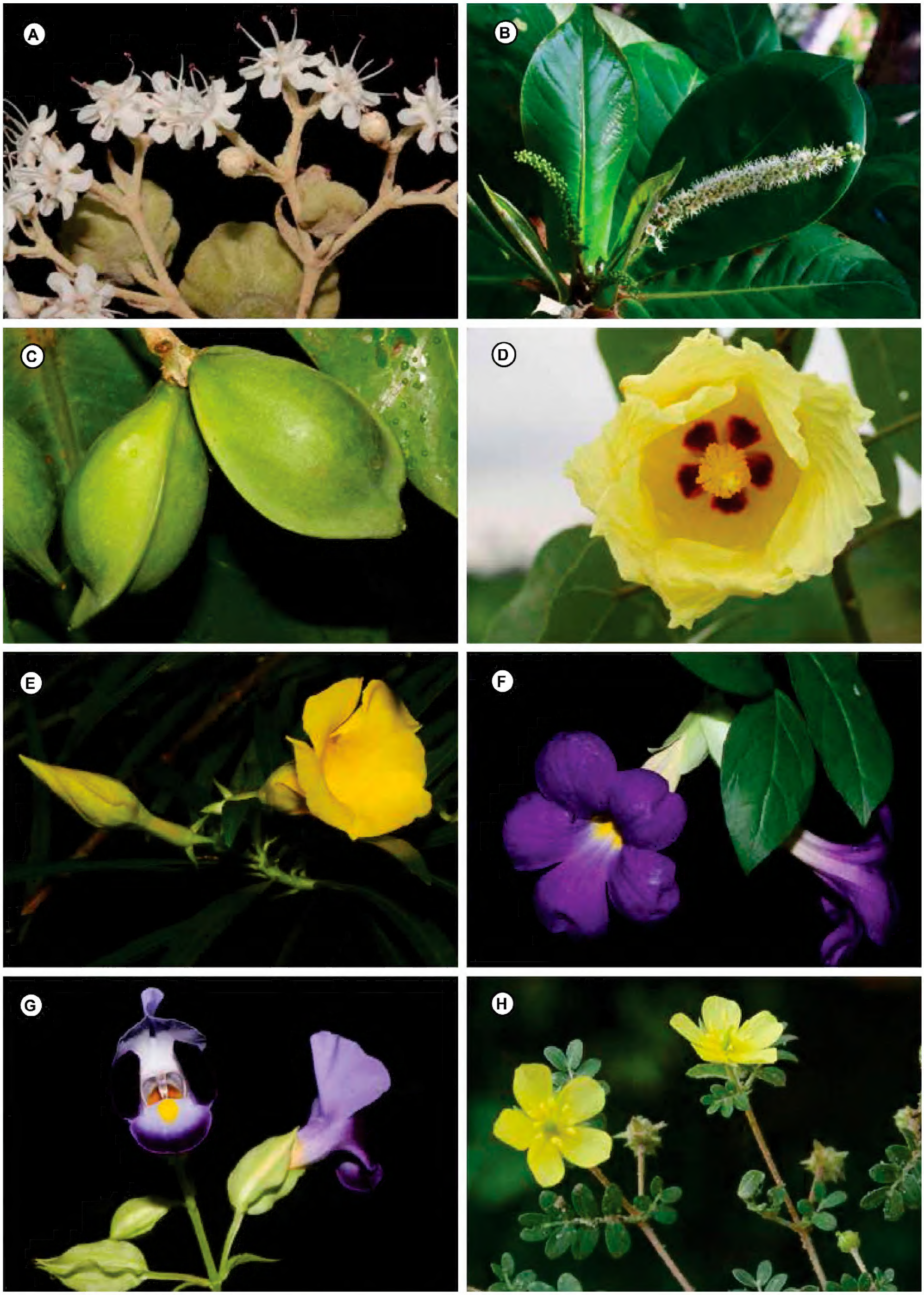

Figure 34. A, *Tectona grandis*; B, *Terminalia catappa*, flower; C, *Terminalia catappa*, fruits; D, *Thespesia populnea*; E, *Thevetia peruviana*; F, *Thunbergia erecta*; G, *Torenia hirsuta*; H, *Tribulus terrestres.*

Figure 35. A, *Triplaris weigeltiana*; B, *Turnera ulmifolia*; C, *Voacanga grandifolia, flower*; D, *Voacanga grandifolia,* fruit; E, *Wrightia tinctoria,* flower; F, *Wrightia tinctoria,* fruit; G, *Zephyranthes rosea.*